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Learn EveryWare

Math 6 Unit 3

Workbook

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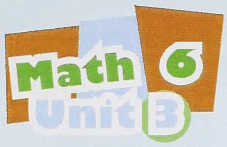

Math 6 Learn EveryWare – Unit 3 Workbook
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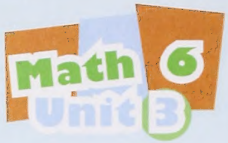

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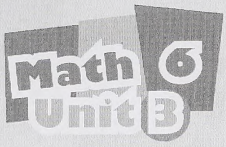

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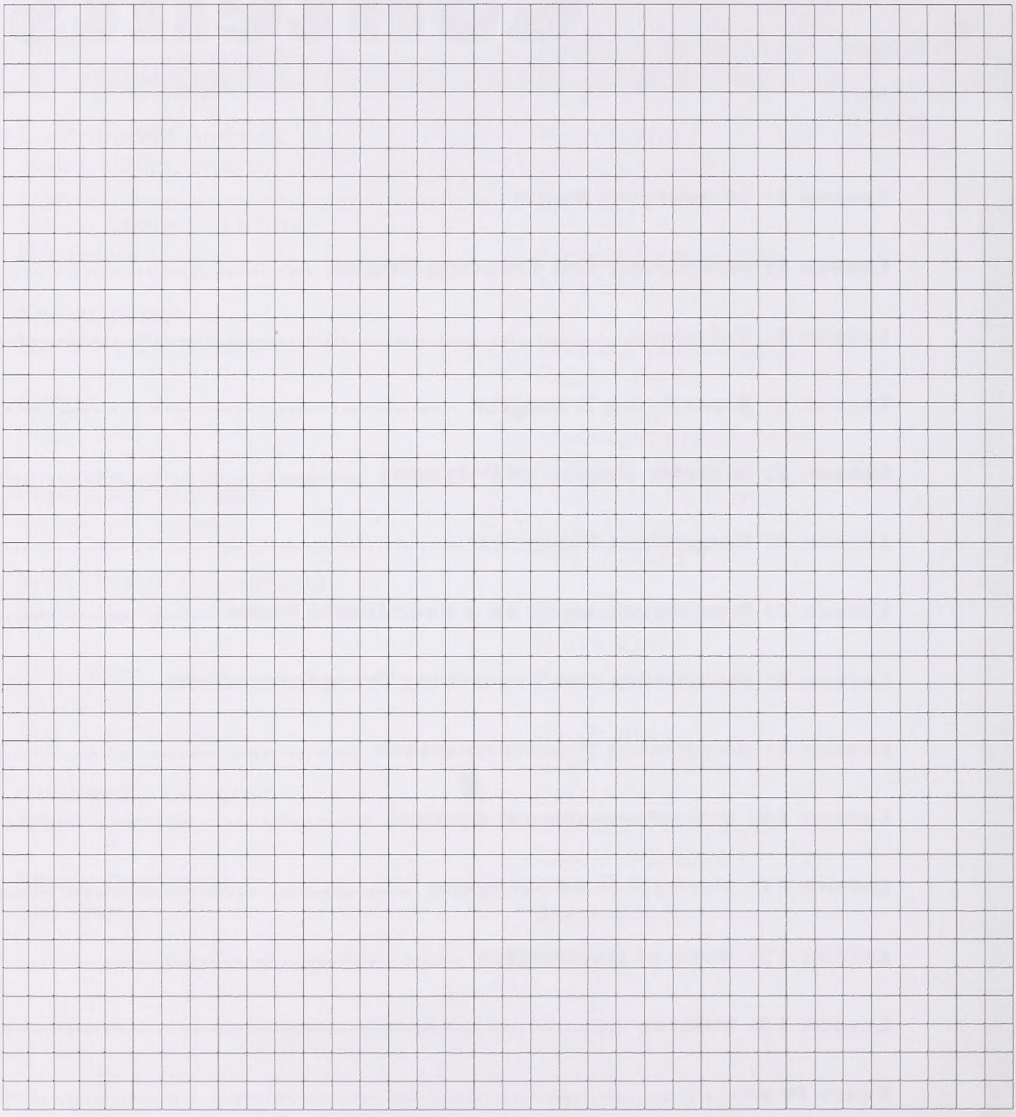


Math 6 Unit 3

Lesson 1

Identifying Angles

Exploration 1: Angles in Your Room

Materials: Pencil

1. Look around your room and identify three objects that form angles that are approximately 90°, 45°, and 135°. List these objects and their estimated angle measure in the table provided.

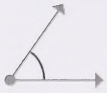
Object Description	Estimated Angle Measure

2. Look around your room and identify angles that are less than 90° and angles that are greater than 90°. List these objects and their estimated angle measures in the table provided.

Object Description - Angles less than 90°
Object Description - Angles greater than 90°

Let's Practice

For 1 – 4: Estimate the measure of the given angle.

1. 

2.

3.

4.

For 5 – 8: Sketch an angle with the given measure.

5. 90°

6. 45°

7. 180°

8. 135°

For 9 – 14: Classify each angle as acute, obtuse, right, or straight.

9.

10.

11.

12.

13.

14.

For 15 – 18: Describe an object around your home, school, or neighbourhood that is...

15. a right angle.

16. an acute angle.

17. an obtuse angle.

18. a straight angle.

19. Estimate the measures of the indicated angles in the road sign.

20. Reflect: What angle measure do you see most often in your environment? Why do you think that is the case?

Mixed Review

For 1 – 5: Measure each segment in centimetres.

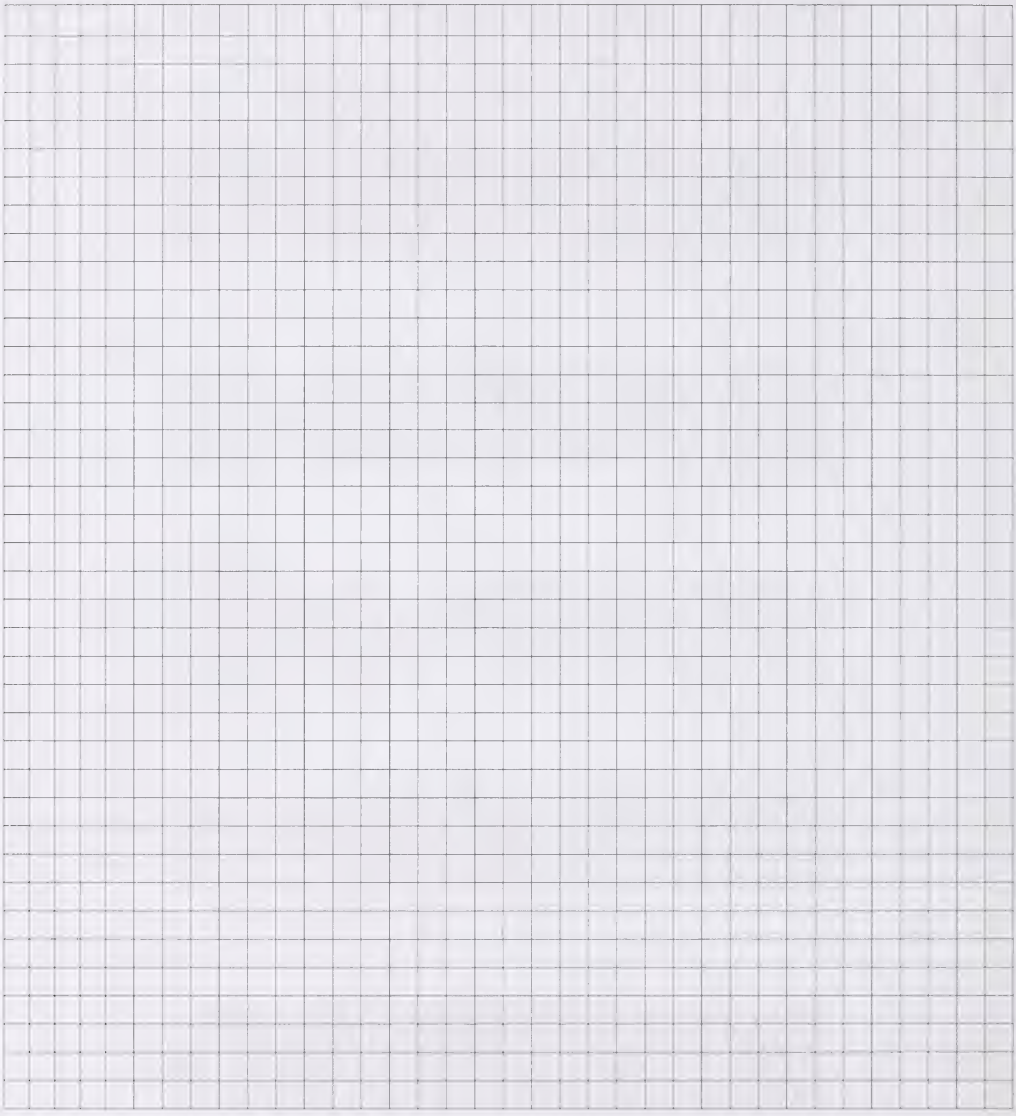
1.

2.

3.

4.

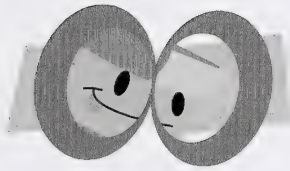
5.



Math 6 Unit 3

Lesson 2

Measuring and Creating Angles



Let's Explore

Exploration 1: Protractors and Angles

Materials: Protractor, Pencil

1. Create your own angle. Hint: Use the straight edge of your protractor to make the rays as straight as possible.

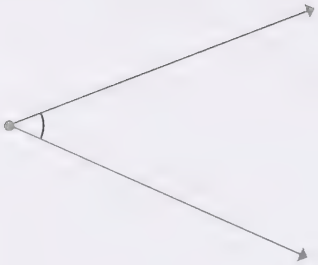
2. Measure your angle using a protractor. Record the measure. _____

3. Reflect: What do you find to be challenging about measuring an angle?

4. Measure the following angles and record your results in the table.

A	
B	
C	
D	

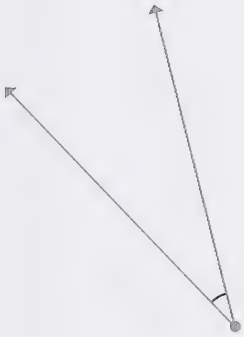
A.



B.

C.

D.



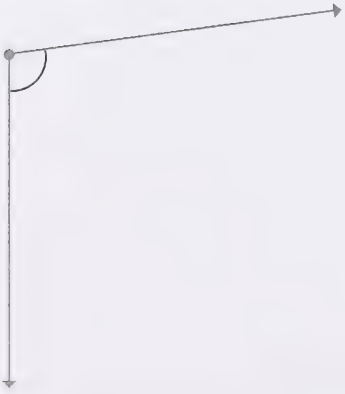
5. Reflect: What can you do to get the most accurate angle measures?

Let's Practice

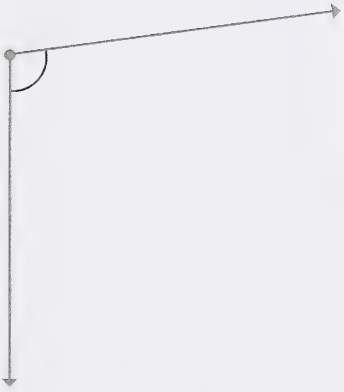
For 1 – 6: Find the measure of each angle.

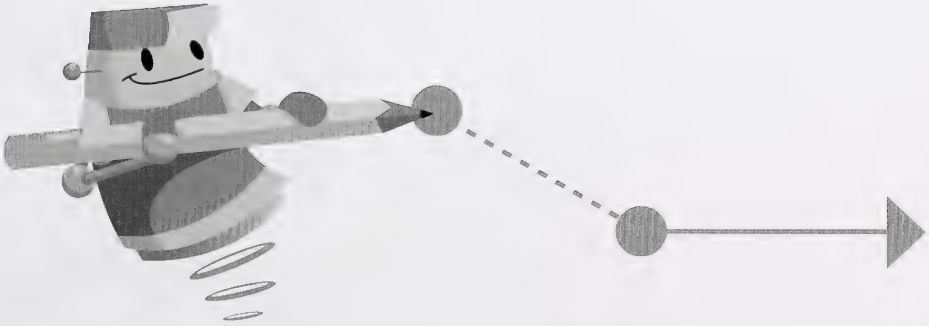
1.

2.



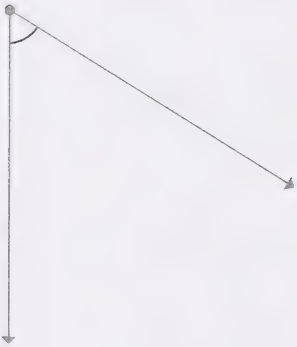
3.

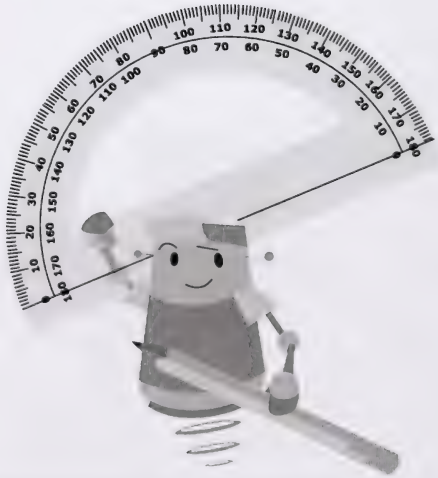
4. 



5.

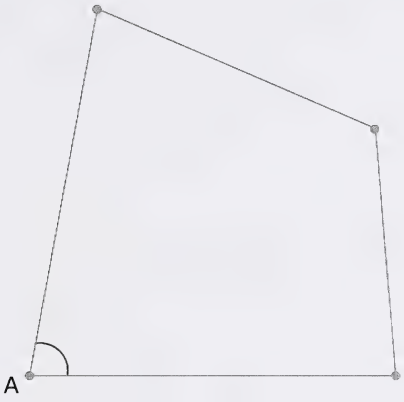
6.



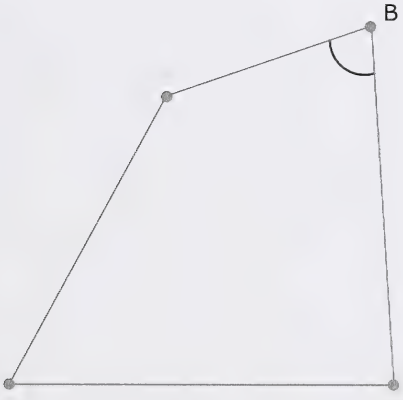


For 7 – 9: Find the measure of the indicated angle in each figure.

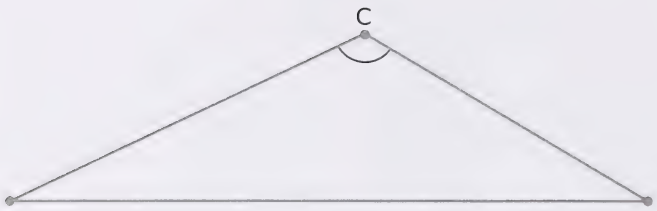
7. ∠A_____



8. ∠B_____



9. $\angle C$ _____



For 10 – 16: Create an angle with the given measure.

10. 120°

11. 40°

12. 85°

13. 165°

14. 68°

15. 90°

16. 142°

17. Reflect: Which type of angles do you find easier to draw and why? Acute or obtuse?

Mixed Review

For 1 – 5: Match the name with the figure.

A. triangle

B. quadrilateral

C. pentagon

D. hexagon

E. octagon

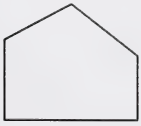
1. _____

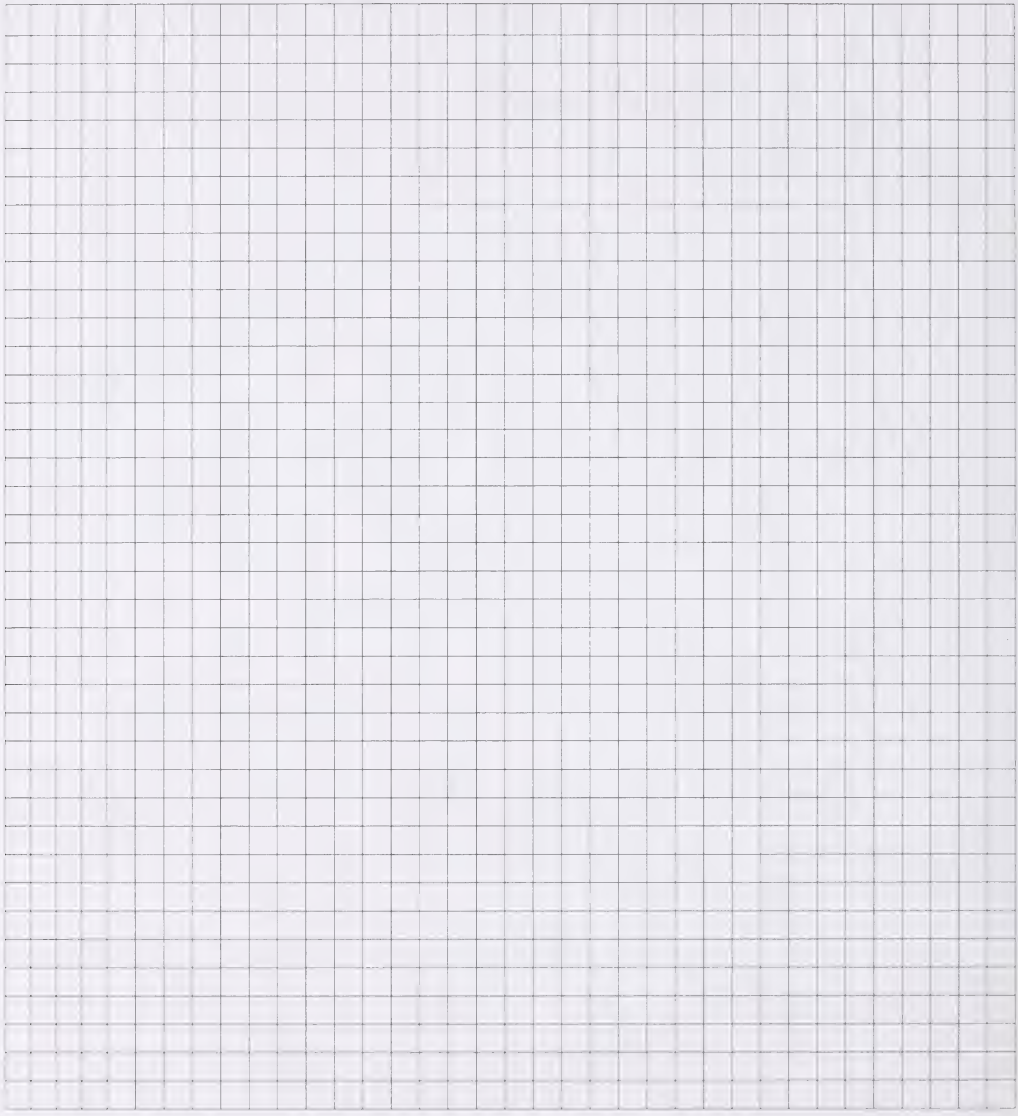
2. _____

3. _____

4. _____

5. _____

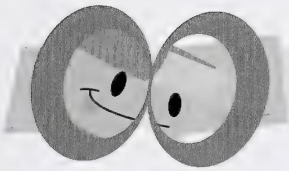




Math 6 Unit 3

Lesson 3

Polygons



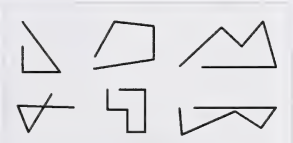
Let's Explore

Exploration 1: Classifying Polygons

Materials: Pencil, Recording Device (optional)

1. Observe the following sets of shapes.

A



B

C

2. What do these shapes have in common?

Sets	Common Traits
A and B	
A and C	
B and C	

3. What is different about these shapes?

Sets	Differences
A and B	
A and C	
B and C	

For 4 – 7: Either record an oral description or write one in the space provided. If recording, follow the recording instructions found at the end of this Exploration.

4. Describe the shapes in Set A.

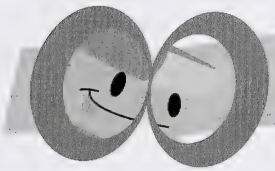
5. Describe the shapes in Set B.

6. Describe the shapes in Set C.

7. The shapes in Set A are called polygons. The shapes in Sets B and C are not polygons. Write or orally record your own definition for **polygon**.

Recording Instructions: Start your recording by saying: My name is _____. This is Math 6, Unit 3, Lesson 3, Exploration 1.

Be sure to hand in your recording with your Workbook.



Let's Explore

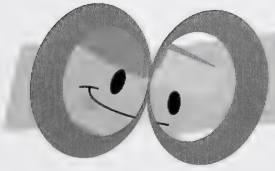
Exploration 2: Congruence

Materials: Scissors, Pencil, Page of Shapes from the back of this unit in your Workbook.

1. Cut out the page of shapes from the back of this unit in your Workbook.
2. Overlay the shapes listed in the table. Compare their size and shape and record your observations in the table.

Figures	Size	Shape
A and B		
A and C		
D and E		
D and F		

3. Complete: Two figures are congruent if they are the same _____ and _____.
4. Reflect: Why does placing one shape over another help you determine if two shapes are congruent?

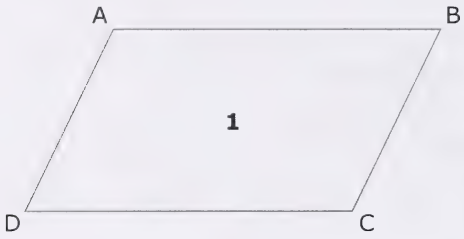


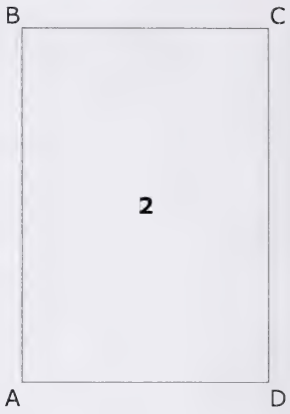
Let's Explore

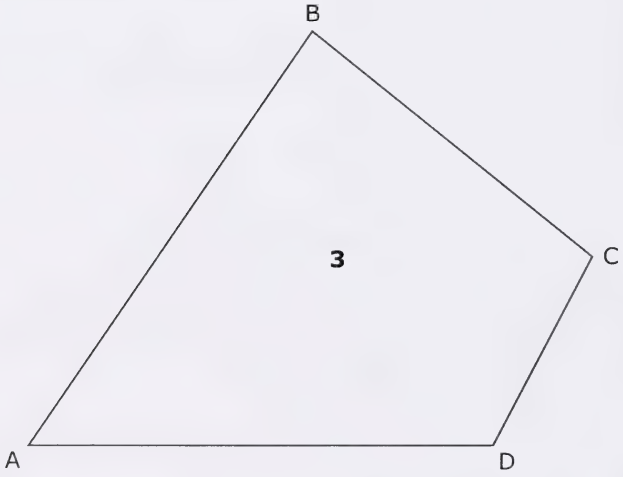
Exploration 3: Measuring Congruence

Materials: Centimetre Ruler, Protractor, Pencil

1. Measure each side of the given shapes in centimetres and each angle in degrees. Record the measures in the table.







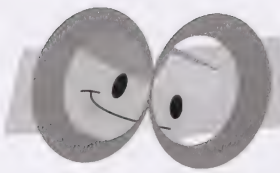
Shape	Side AB	Side BC	Side CD	Side DA	Angle A	Angle B	Angle C	Angle D
1								
2								
3								

2. Name the parts of Shape 1 that are congruent.

3. Name the parts of Shape 2 that are congruent.

4. Name the parts of Shape 3 that are congruent.

5. Are any of the three figures congruent? Why or why not?

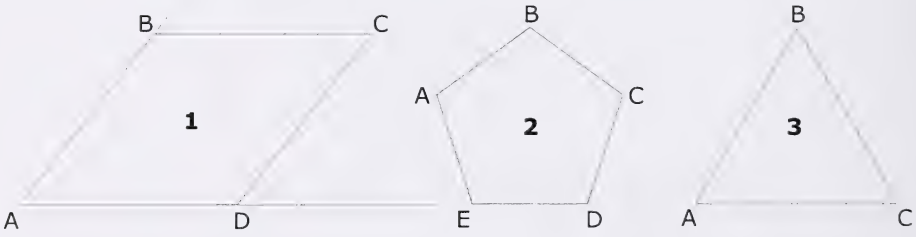


Let's Explore

Exploration 4: Regular or Irregular

Materials: Centimetre Ruler, Protractor, Pencil

1. Measure each side of the following shapes. Measure each angle in the shapes. Label the figures with each angle measure and side length. Hint: You can extend the lines of the sides with your pencil and the straight edge of your protractor. This will help you to read the angle measure on your protractor.



A **regular polygon** is a polygon with all sides congruent and all angles congruent. An **irregular polygon** has sides of various measures.

2. Which of the shapes are regular polygons?

3. Which of the shapes are irregular polygons?

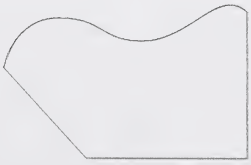
4. Draw two shapes that are regular polygons.

5. How can you tell that your shapes are regular polygons?

6. Reflect: Name one regular polygon in your everyday life.

Let's Practice

For 1 – 3: Write "polygon" or "not a polygon" for each figure.

1. 

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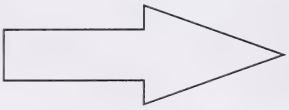
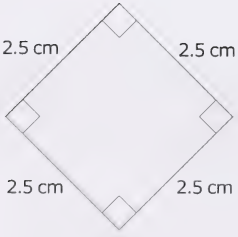


3.

For 4 – 6: Write "regular" or "irregular" for each polygon.

4.

5.



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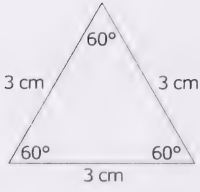
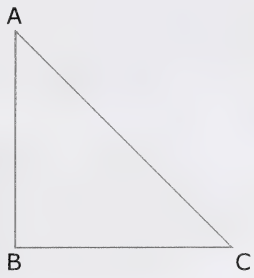


For 7 – 9: Measure each angle and segment. List all parts that are congruent. Hint: You can extend the lines.

7.



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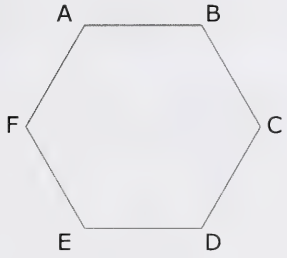

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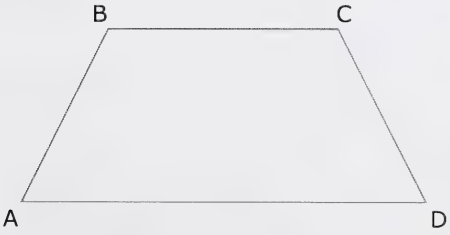
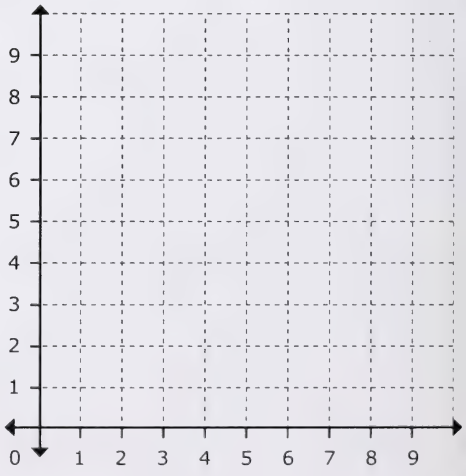


10. Reflect: Name an object in your home that has congruent parts. Describe the object and the parts that are congruent.

Mixed Review

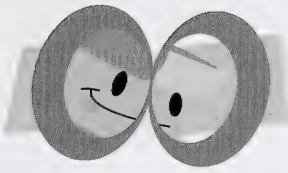
For 1 – 5: Graph the given points on the coordinate plane.

1. A (2, 8)
2. B (0, 4)
3. C (7, 1)
4. D (8, 2)
5. E (5, 0)



Lesson 4

Classifying Triangles



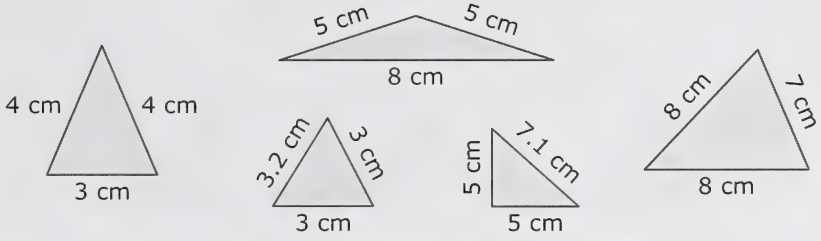
Let's Explore

Exploration 1: Classifying Triangles by Sides

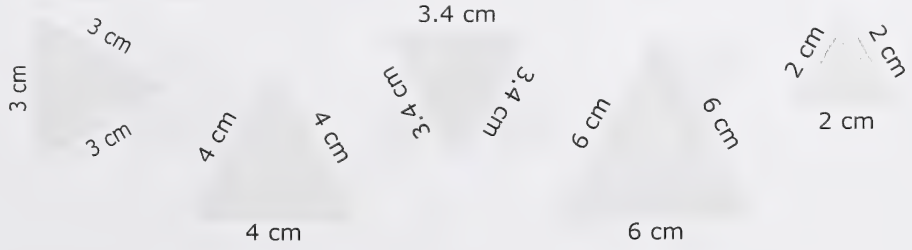
Materials: Centimetre Ruler, Pencil, Recording Device (optional)

1. Observe the following sets of triangles.

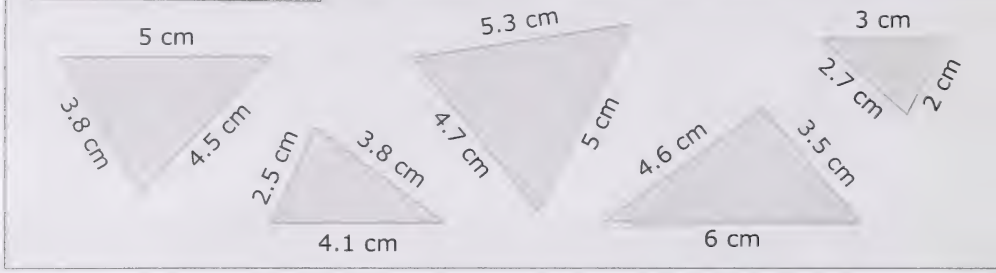
Isosceles Triangles



Equilateral Triangles



Scalene Triangles

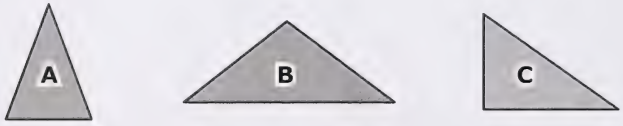


For 2: Either record your answers or write them in the space provided. If recording, follow the recording instructions found at the end of this Exploration.

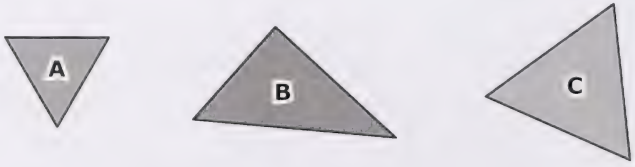
2. What do the triangles in each set have in common?

   a. **Isosceles triangles**
   b. **Equilateral triangles**
   c. **Scalene triangles**

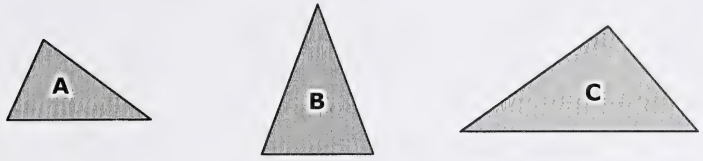
3. Use a centimetre ruler to identify the isosceles triangles in this set:



4. Use a centimetre ruler to identify the equilateral triangles in this set:



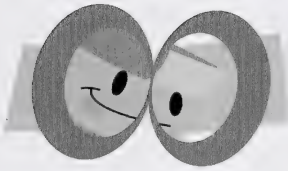
5. Use a centimetre ruler to identify the scalene triangles in this set:



Recording Instructions: Start your recording by saying: My name is _____.

This is Math 6, Unit 3, Lesson 4, Exploration 1.

Be sure to hand in your recording with your Workbook.



Let's Explore

Exploration 2: Obtuse and Right Triangles

Materials: Straws, String, Centimetre Ruler, Scissors, Protractor, Pencil

For 1 – 5: Use the materials listed to help you answer the questions.

1. Can you create a triangle with two obtuse angles? Explain.

2. Can you create a triangle with two right angles? Explain.

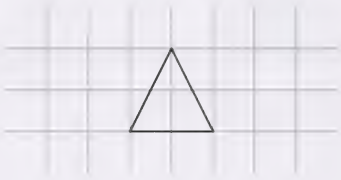
3. Can you create a triangle that is isosceles and right? Explain.

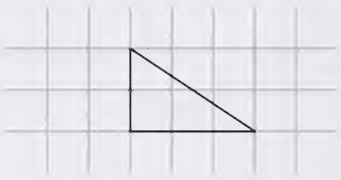
4. Can you create a triangle that is equilateral and obtuse? Explain.

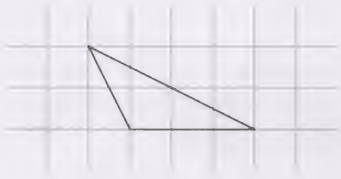
5. Can you create a triangle that is isosceles and obtuse? Explain.

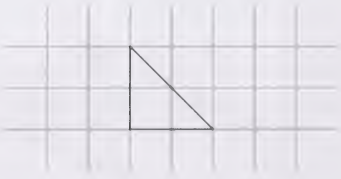
Let's Practice

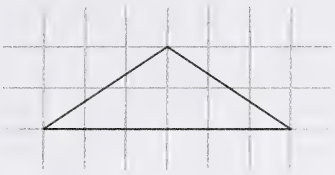
For 1 – 6: Classify each triangle in two ways.

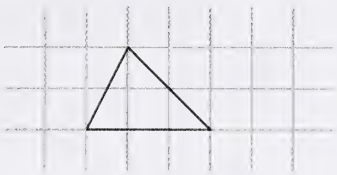
1. 

2. 

3. 

4. 

5. 

6. 

For 7 – 10: Use a protractor and a centimetre ruler.

7. Draw an equilateral acute triangle.

8. Draw an isosceles obtuse triangle.

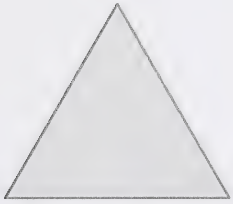
9. Draw a scalene obtuse triangle.

10. Draw an isosceles right triangle.

11. What types of triangles are formed by drawing a line down the middle of this equilateral triangle?

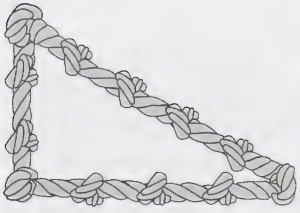
12. Nina is trying to form a triangle with a right angle and an obtuse angle. Why is she having trouble?

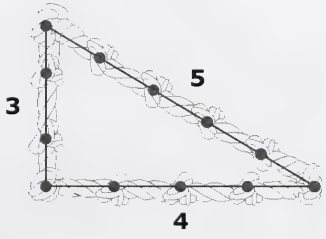
13. Use a protractor to measure the angles and a ruler to measure the sides of this equilateral triangle. Mark the angles and sides in the figure.



14. Reflect: In building pyramids, ancient Egyptians would use rope tied in equally spaced knots to make sure the corners were square.

    This rope forms a scalene right triangle:

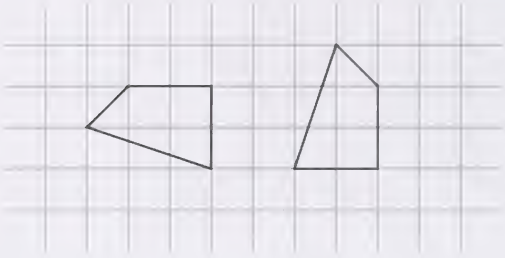




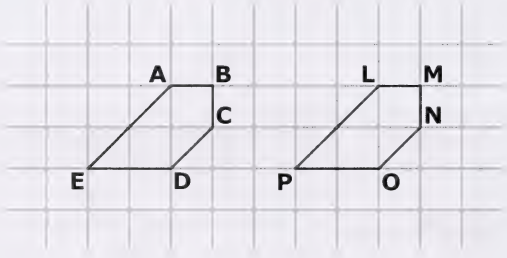
What are some other types of triangles you can create using this rope?

Mixed Review

1. Are the shapes congruent?



For 2 - 5: Identify the corresponding parts of the given congruent figures.



2. D corresponds to _____

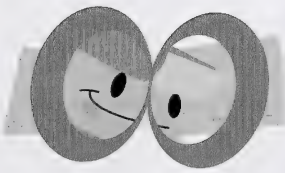
3. side BC corresponds to side _____

4. C corresponds to _____

5. side EA corresponds to side _____

Lesson 5

Interior Angles of Polygons



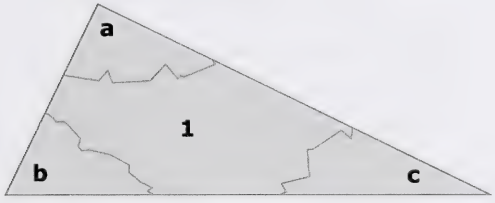
Let's Explore

Exploration 1: Angles in a Triangle

Materials: Page of Triangles from the back of this unit in your Workbook, Scissors, Straight Edge, Protractor, Pencil, Paper

1 Cut out the triangles from the page in your Workbook.

2. Tear each corner from the triangle labelled 1.

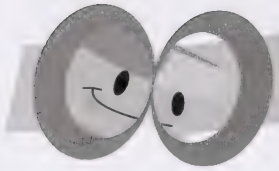


3. Position the torn angles so that the vertex of each angle is together and the sides are lined up:

4. Measure the angle formed by the three parts together. What type of angle is formed by the three angles placed together like this?

5. Repeat these instructions with triangles 2 and 3.
6. Draw two more triangles and repeat the instructions.
7. Complete the statement:

The angles of a triangle add up to _____ degrees.

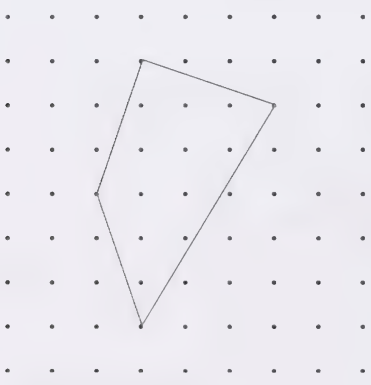


Let's Explore

Exploration 2: Angles of a Quadrilateral

Materials: Dot Paper from the back of this unit in your Workbook, Pencil, Protractor

1. Create a quadrilateral on your dot paper that looks like this:



2. Measure each angle of the quadrilateral and record them in the table. Find the sum of the angles and record them in the final column of the table.

3. Create five more quadrilaterals of your own. Record the measures of the angles and find the sum of the angles.

Figure	Angle 1	Angle 2	Angle 3	Angle 4	Sum of Angles
1					
2					
3					
4					
5					
6					

4. What do you notice about the sum of the angles for each quadrilateral?

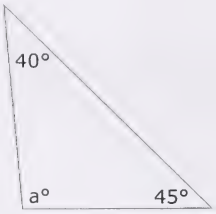
5. Complete this statement:

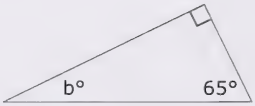
   The sum of the angles in a quadrilateral is _____ degrees.

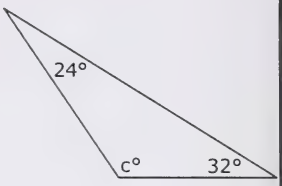
Let's Practice

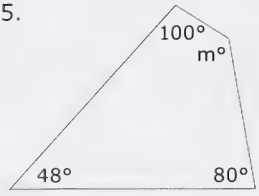
1. Alyssa has found the measures of two angles in a triangle. They are 68° and 45°. How can she find the measure of the third angle without measuring? What is the measure of the third angle?

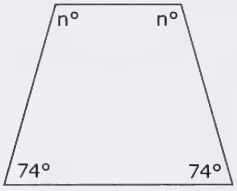
For 2 – 7: Find the missing angle.

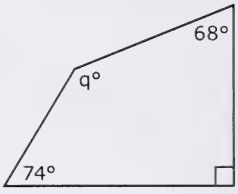
2. 

3. 

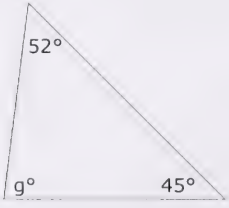
4. 

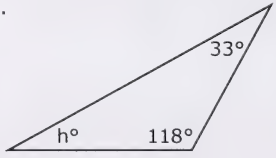
5. 

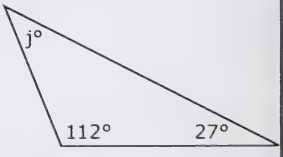
6. 

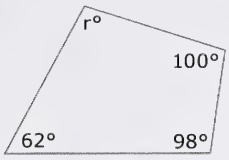
7. 

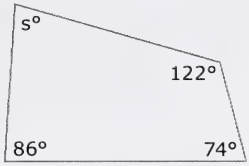
For 8 – 13: Write an equation and solve to find the missing angle.

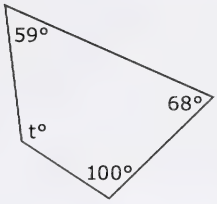
8. 

9. 

10. 

11. 

12. 

13. 

14. Lian has measured the angles of an isosceles triangle. One angle measures 36° and the other two angles have the same measure. What is the measure of the two missing angles?

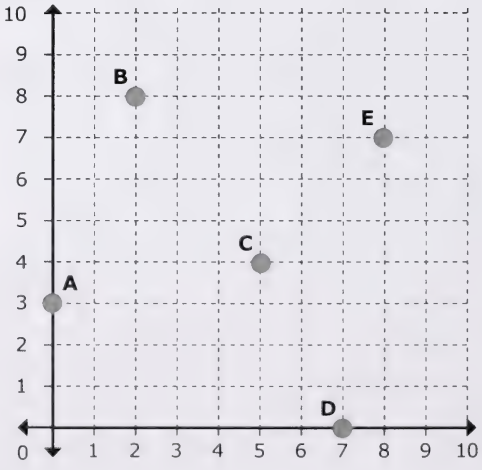
15. Daksha is drawing a triangle that has a second angle that is double the measure of the first angle. The third angle is the sum of the other two angle measures. Can you find the measures of the angles?

16. Reflect: Nina thinks that the sum of the angles in a pentagon will be 540°. Do you think she is right or wrong? Explain your reasoning.

Mixed Review

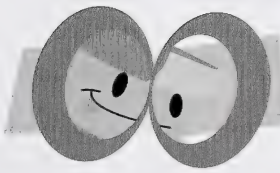
For 1 – 5: Name the coordinates of the points on the figure.

1. A _____
2. B _____
3. C _____
4. D _____
5. E _____



Lesson 6

Congruent Polygons



Let's Explore

Exploration 1: Congruent Parts

Materials: Scissors, Pencil, Page of Shapes (Exploration 1) from the back of this unit in your Workbook, Paper

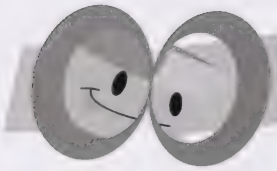
1. Cut out all of the shapes from your page.
2. Overlap the shapes to find those that are congruent.
3. Name the congruent shapes:

4. How can you tell that your shapes are congruent?

5. Name the corresponding angles for each pair of congruent shapes.

Figures	Corresponding Angles				

6. Create two shapes of your own that are congruent. Describe how you made your shapes.



Let's Explore

Exploration 2: Measuring Quadrilaterals

Materials: Pencil, Protractor, Centimetre Ruler, Page of Shapes (Exploration 2) from the back of this unit in your Workbook

1. Measure the angles and side lengths of each figure on your Exploration page. Record the results in the given table.

Figure	$\angle A$	$\angle B$	$\angle C$	$\angle D$	$\overline{AB}$	$\overline{BC}$	$\overline{CD}$	$\overline{DA}$
1								
2								
3								
4								
5								
6								

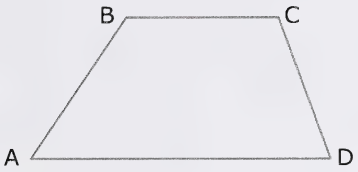
2. Which figures are congruent? How can you tell?

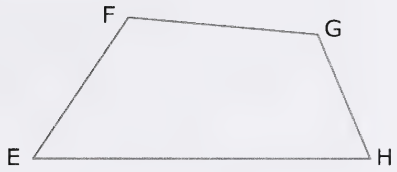
Let's Practice

For 1 – 5: Decide if the figures are congruent by measuring the corresponding parts. Use a centimetre ruler and a protractor.

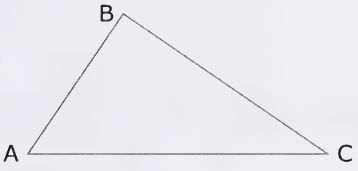
Lesson 6: Congruent Polygons

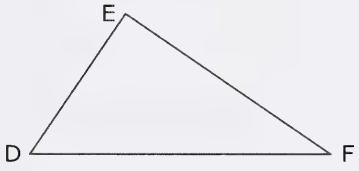
1.



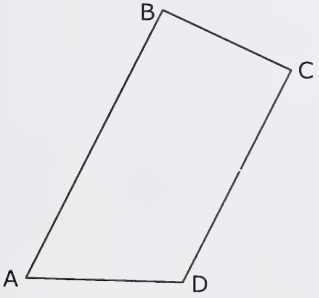


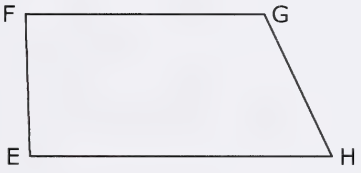
2.



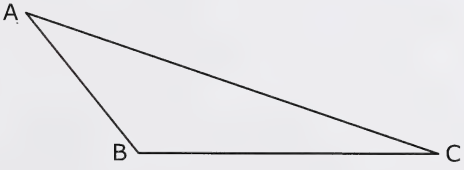


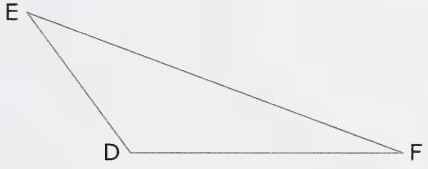
3.



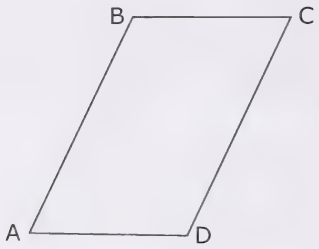


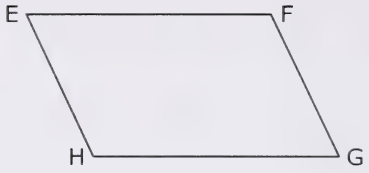
4.





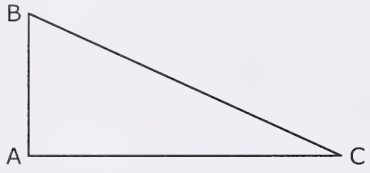
5.

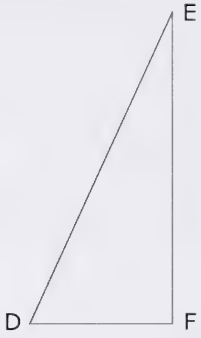




For 6 – 10: Name the congruent parts to these congruent shapes.

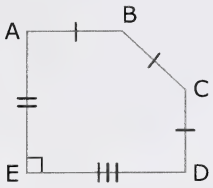
6.

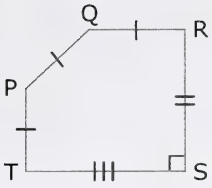




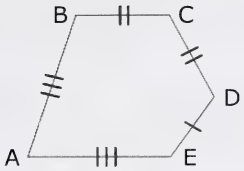
7.

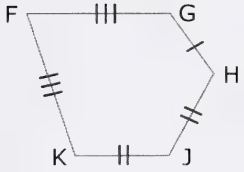
8.



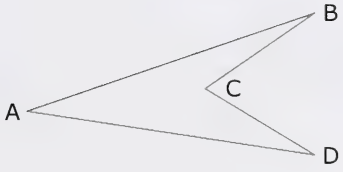


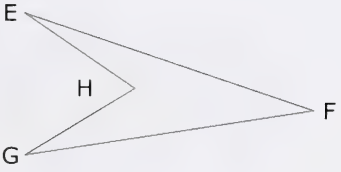
9.





10.





11. Alyssa is making a garden with her soccer team. Each of the 12 players gets a congruent rectangular plot for planting. When they finish, they plan to put a fence around the outside of the garden. What is the length of the fence they will construct?

12. Reflect: If two squares have two sides that are the same side length, are they congruent? Explain.

Mixed Review

1. Which of these is a clockwise quarter-turn of the letter P?

A. P B. C. D.

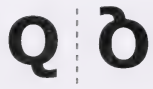
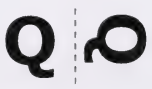
2. Which of these is a half-turn of the letter R?

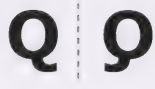
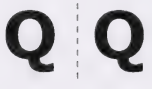
A. B. C. R D.

3. Which of the following has one line of symmetry?

A. Q B. R C. S D. T

4. Which of the following is a reflection in the given line?

A.  B. 

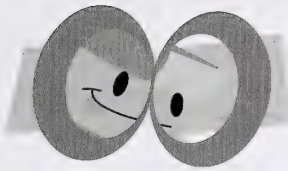
C.  D. 

5. What type of transformation is shown?

Math 6 Unit 3

Lesson 7

Transformations on a Coordinate Plane



Let's Explore

Exploration 1: Digital Transformations

Materials: Internet, Pencil

1. Go to the website: http://www.learnalberta.ca/content/memg/index.html
2. On the left select **Grades 4 to 6**.
3. Scroll down and select **Reflection (Flip)**.
4. Use the Demonstration Applet until you are familiar with reflections. This activity will help you explore reflections. Answer the following questions:

   a. What do you notice about the distance of each shape from the line?

   b. When you move the pre-image closer to the line, what happens to the image?

   c. What did you notice about the size and shape of the pre-image and the image?

d. What did you notice about the orientation of the two shapes?

5. On the left scroll down and select **Translation (Slide)**.

6. Use the Demonstration Applet until you are familiar with translations. This activity will help you explore translations. Answer the following questions:

   a. What happens when you change the length of the line between the shapes?

   b. Why does the image change when you change the pre-image?

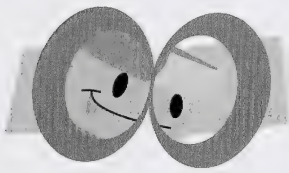
7. On the left scroll down and select **Rotation (Turn)**.

8. Use the Demonstration Applet until you are familiar with rotations. This activity will help you explore rotations. Answer the following questions:

   a. What is the difference between the pre-image and its image after a rotation?

   b. Which shape(s) appear to be a reflection under a $\frac{1}{2}$ turn?

   c. What type of rotation puts the image on top of the pre-image?



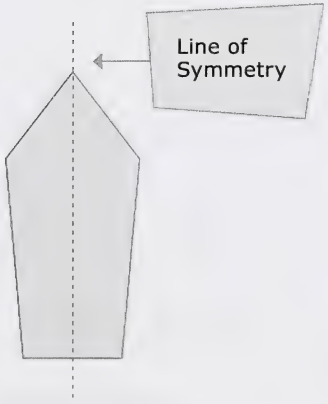
Let's Explore

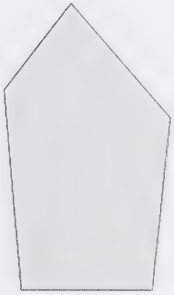
Exploration 2: Transformations on the Coordinate Plane

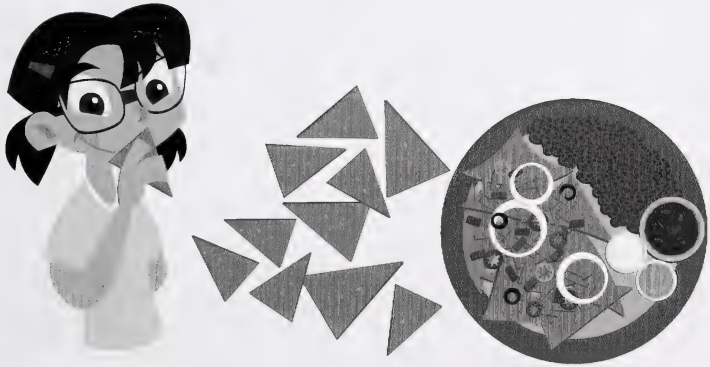
Materials: Pencil, Straight Edge, Paper, Scissors

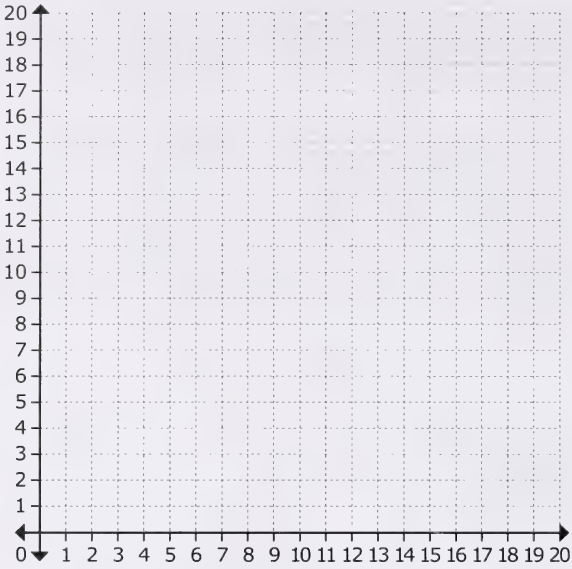
1. Create your own shape on the coordinate plane. Make sure that your shape is **asymmetrical**. This means that you cannot draw a line of symmetry on the shape.

Symmetrical **Asymmetrical**



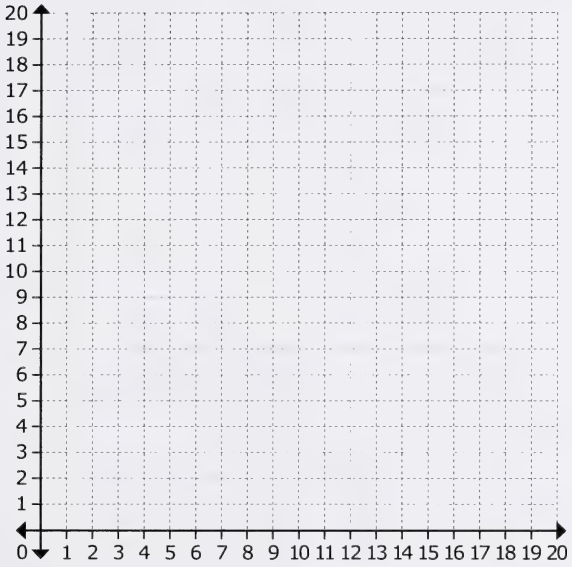






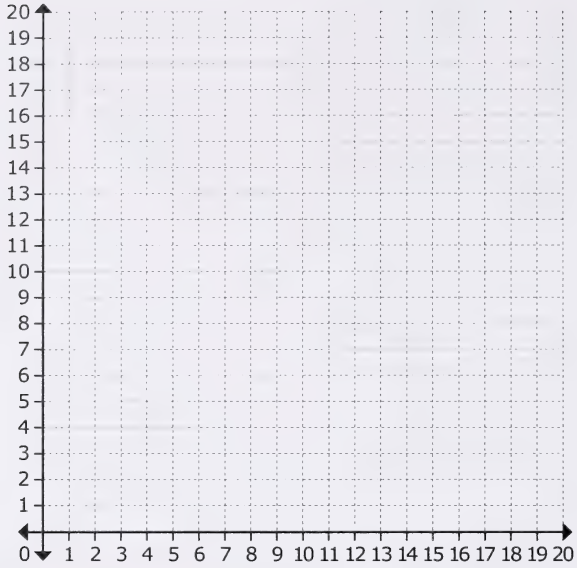
2. Trace your shape on a separate piece of paper. Cut out the tracing. You can use this duplicate of your shape to perform transformations on the coordinate plane.

3. Perform a **translation** of your shape. Identify the coordinates of each vertex on the pre-image and the image.



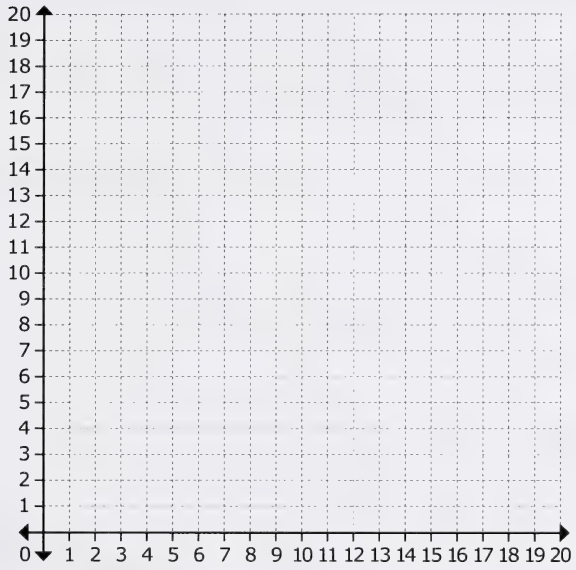
Pre-image	Image

4. Perform a **rotation** of your shape. Identify the coordinates of each vertex of the pre-image and the image.



Pre-image	Image

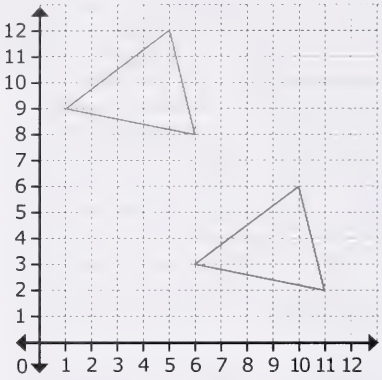
5. Perform a **reflection** of your shape. Identify the coordinates of each vertex of the pre-image and the image.



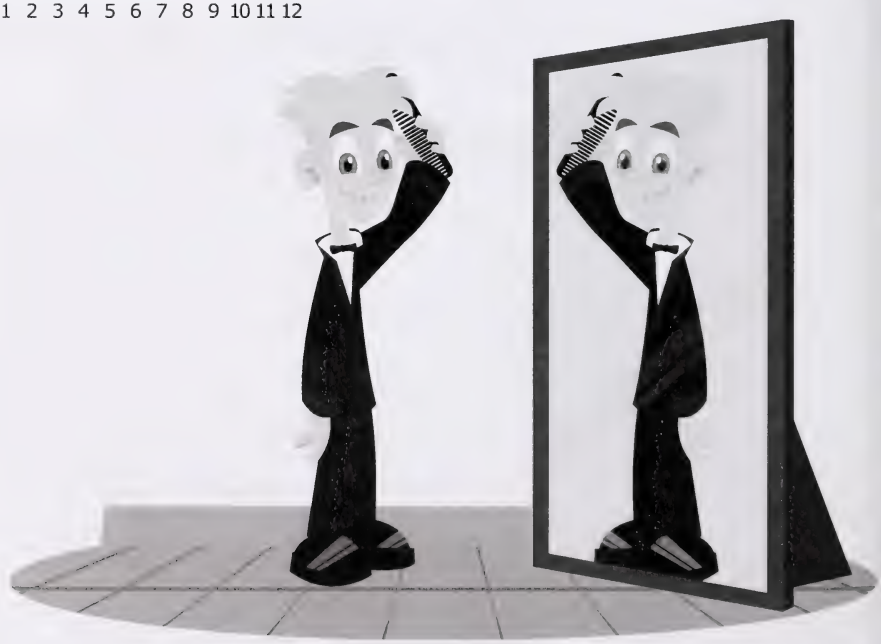
Pre-image	Image

Let's Practice

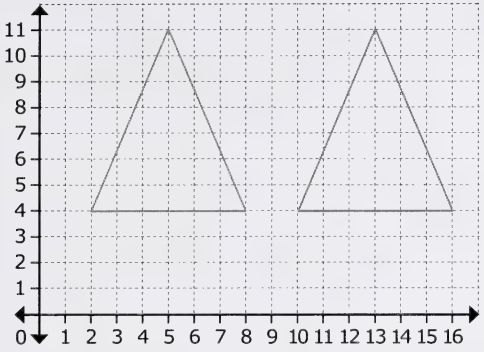
1. Daksha listed the corresponding vertices of the pre-image and the image. What is wrong with his answer? Write the correct answer.



Pre-image	Image
(1, 9)	(6, 3)
(5, 12)	(11, 2)
(6, 8)	(10, 6)

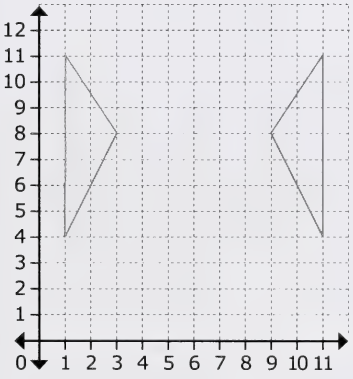


2. Alyssa cannot tell if the transformation performed on the pre-image is a translation or a reflection. Why is she struggling with this answer?

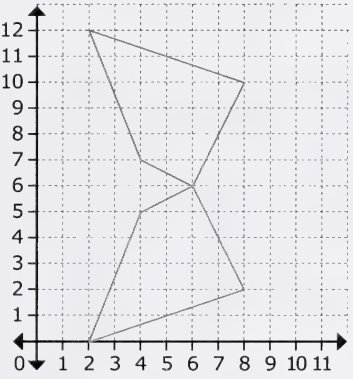


For 3 – 4: Draw the line of reflection for the following reflections.

3.

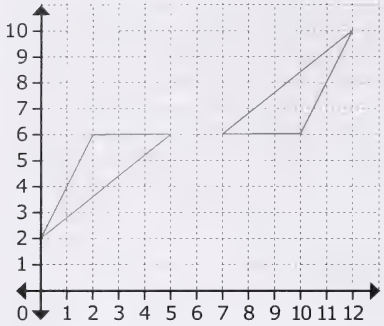


4.



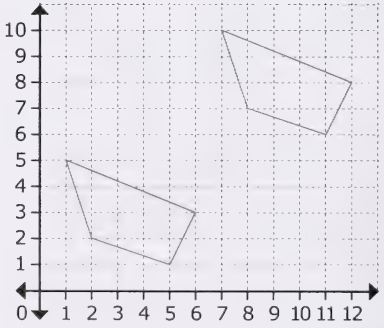
For 5 – 9: The pre-image coordinates are given. Name the coordinates of the vertices of the image. What type of transformation is shown?

5. _____



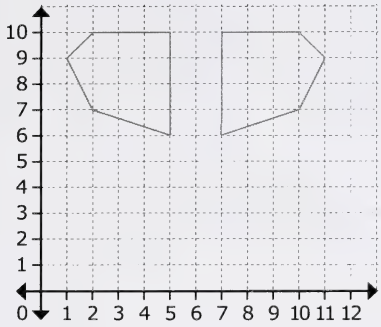
Pre-image	Image
(0, 2)	
(2, 6)	
(5, 6)	

6. _____



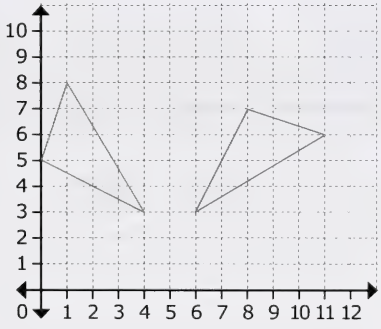
Pre-image	Image
(8, 7)	
(7, 10)	
(12, 8)	
(11, 6)	

7. _____



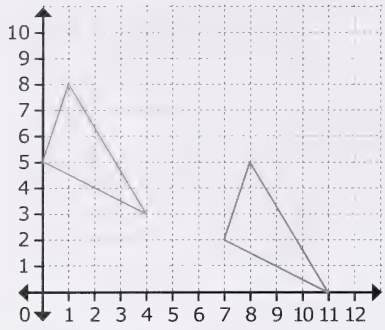
Pre-image	Image
(7, 6)	
(7, 10)	
(10, 10)	
(11, 9)	
(10, 7)	

8. _____



Pre-image	Image
(0, 5)	
(1, 8)	
(4, 3)	

9. _____



Pre-image	Image
(0, 5)	
(1, 8)	
(4, 3)	

10. Reflect: Given a translation, how do the size and shape of the pre-image compare to the size and shape of the image?

Mixed Review

For 1 – 5: Find the area of each given rectangle, in square units.

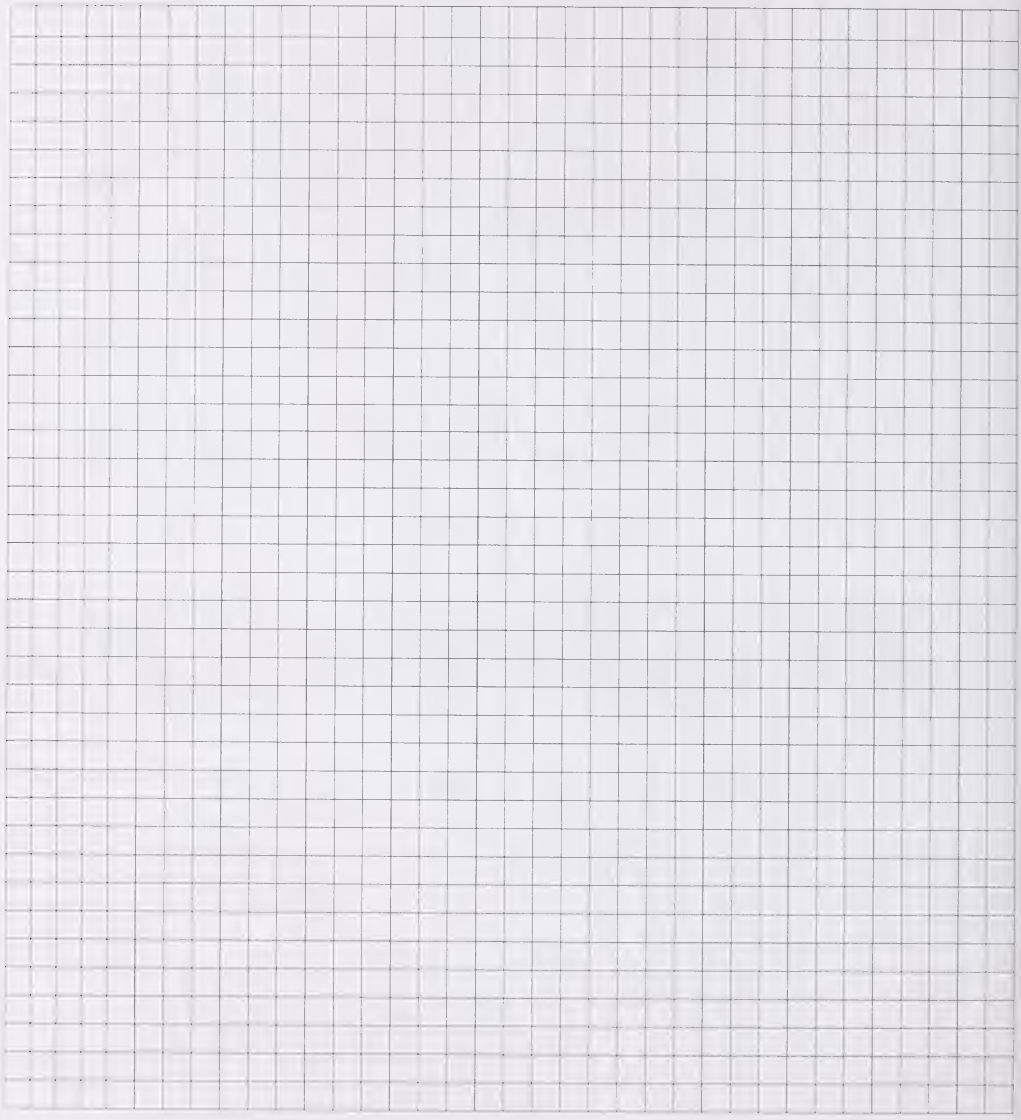
1.

2.

3.

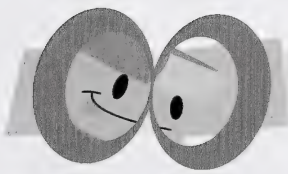
4.

5.



Lesson 8

Measuring and Describing Transformations



Let's Explore

Exploration 1: Measuring Transformations on a Coordinate Plane

Materials: Coordinate Planes from the back of this unit in your Workbook, Pencil Crayons, Protractor, Centimetre Ruler

1. a. Use one colour to create a quadrilateral with the following vertices: A (1, 4), B (3, 8), C (8, 8), D (6, 4). Quadrilateral ABCD is the pre-image.

   b. Use another colour to create a quadrilateral with the following vertices: A′ (6, 11), B′ (8, 15), C′ (13, 15), D′ (11, 11). This is the image of Quadrilateral ABCD.

   c. Measure the segments of both the pre-image and the image. Measure the angles of both the pre-image and the image. Record the measures in centimetres and degrees.

	AB	BC	CD	DA	A	B	C	D
Pre-image								
	A′B′	B′C′	C′D′	D′A′	A′	B′	C′	D′
Image								

   d. What type of transformation has been performed on Quadrilateral ABCD?

   e. What do you notice about the measures of the segments and the angles?

2. a. Use another coordinate plane to graph the following pre-image and image. Use a different colour for each figure.

   A (2, 13), B (9, 19), C (7, 13)

   A′ (14, 11), B′ (7, 5), C′ (9, 11)

   b. Measure and record the side lengths and angle measures of Triangle ABC and its image.

	AB	BC	CA	A	B	C
Pre-image						
	A′B′	B′C′	C′A′	A′	B′	C′
Image						

   c. What type of transformation has been performed on Triangle ABC?

   d. What do you notice about the measures of the segments and the angles?

3. a. Use another coordinate plane to graph the following pre-image and image. Use a different colour for each figure.

   A (2, 10), B (0, 16), C (9, 17), D (7, 11)

   A′ (18, 10), B′ (20, 16), C′ (11, 17), D′ (13, 11)

   b. Measure and record the angle measures and side lengths of Quadrilateral ABCD and its image.

	AB	BC	CD	DA	A	B	C	D
Pre-image								
	A′B′	B′C′	C′D′	D′A′	A′	B′	C′	D′
Image								

c. What type of transformation has been performed on Quadrilateral ABCD?

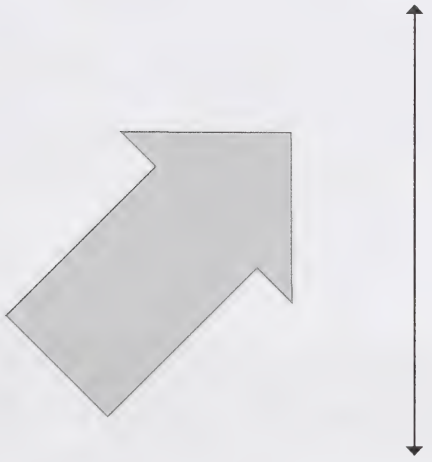
d. What do you notice about the measures of the segments and the angles?

4. Look at your three transformations and complete this statement: In a translation, rotation, or reflection the pre-image and image are _____.

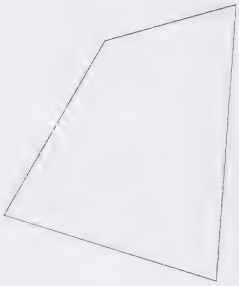
Exploration 2: Reflections with a MIRA

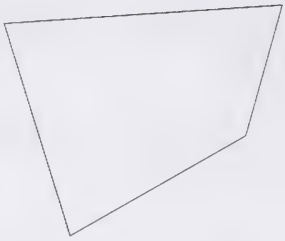
Materials: MIRA, Pencil, Ruler

1. Draw a reflection of the figure using a MIRA.



2. Find the line of reflection of the image and pre-image using a MIRA. Draw the line of reflection and label it **t**.



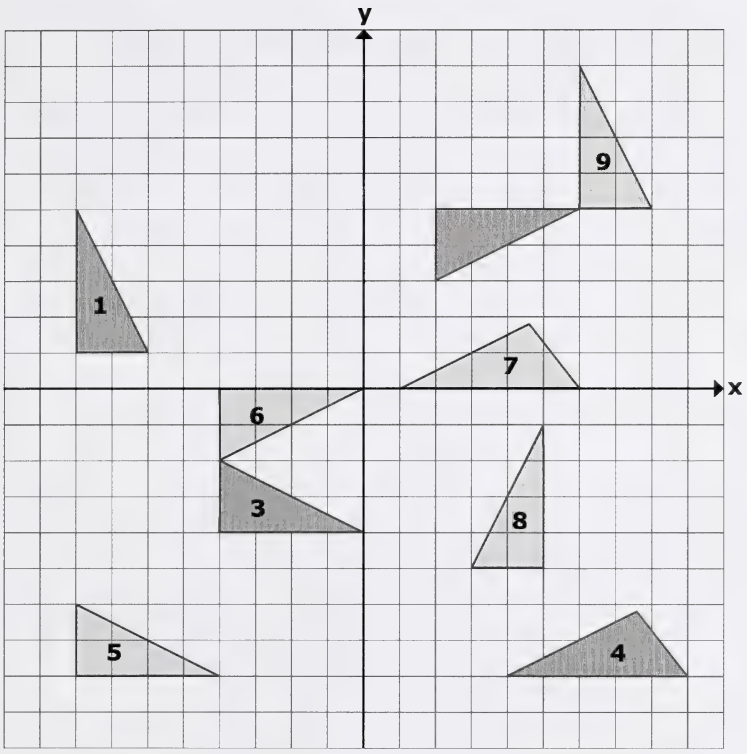


3. Use the image and pre-image from number 2. Draw a line between each vertex on the pre-image and its corresponding vertex on the image. Measure the distance from each vertex to the line of reflection.

4. What do you observe about the distance from the line of reflection to the vertex on the image and pre-image for each vertex?

Let's Practice

For 1 – 4: Describe the translation that takes each pre-image to its image.



1. The image of triangle 1 is triangle ____. Describe the translation.

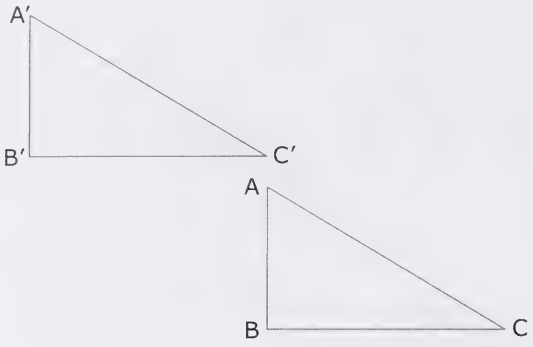
2. The image of triangle 2 is triangle ____. Describe the translation.

3. The image of triangle 3 is triangle ____. Describe the translation.

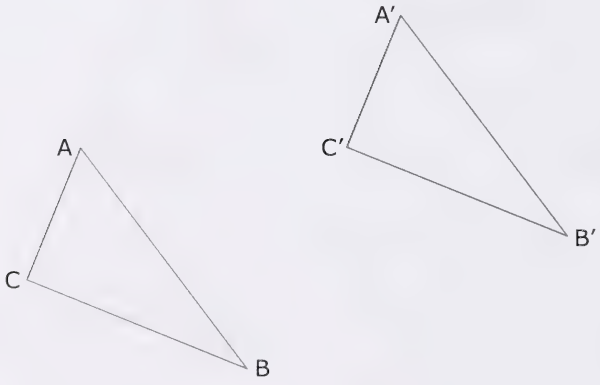
4. The image of triangle 4 is triangle ____. Describe the translation.

For 5 – 6: Draw the line of translation of ABC to A'B'C'.

5.

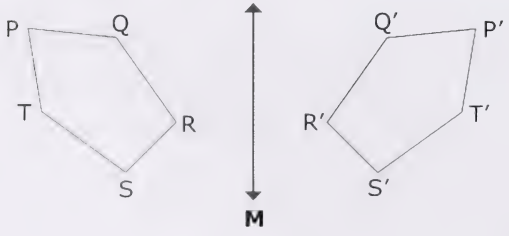


6.

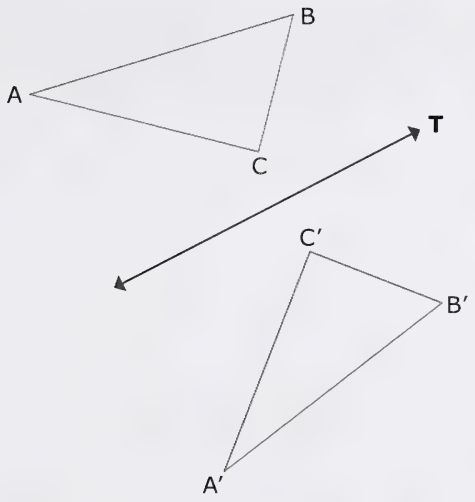


For 7 – 8: Describe the transformation shown.

7.

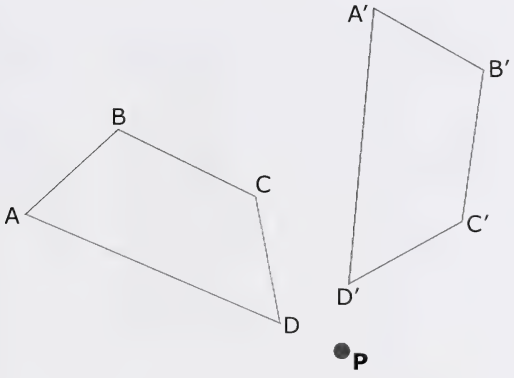


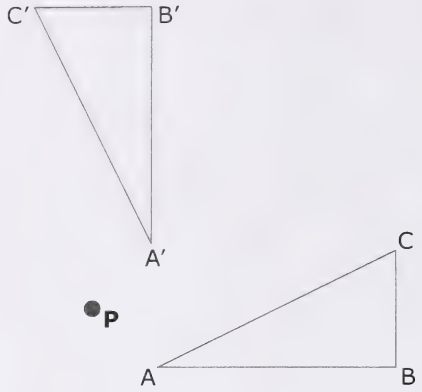
8.



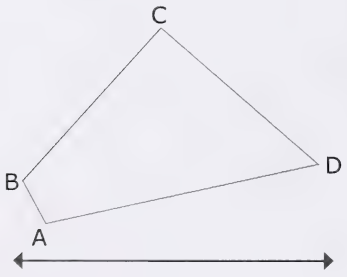
For 9 – 10: Find the angle of rotation.

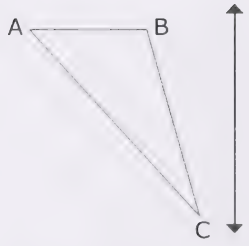
9.



10. 

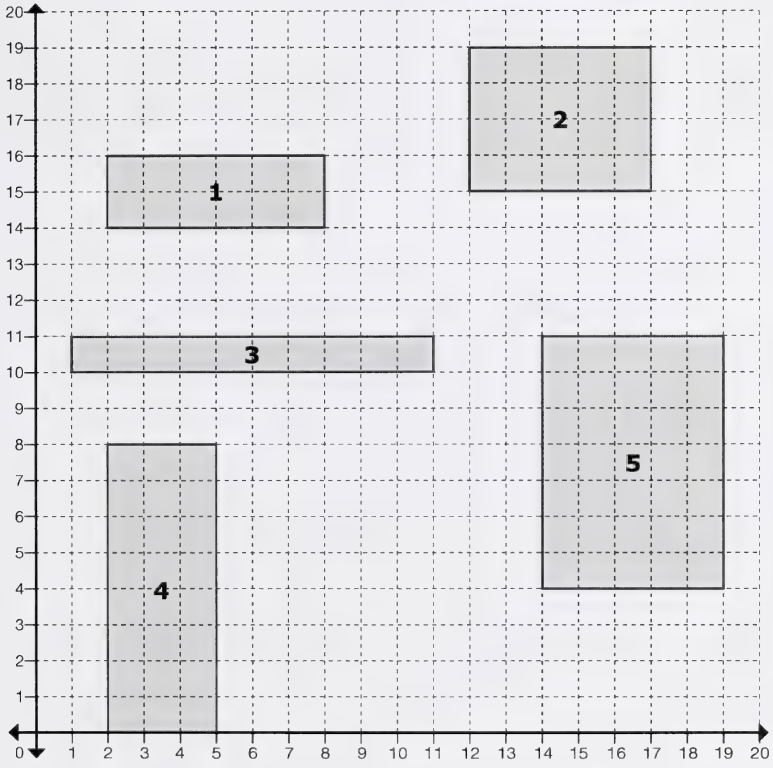
For 11 – 12: Use a MIRA to create a reflection of the pre-image in the given line.

11. 

12. 

Mixed Review

For 1 – 5: Find the perimeter of each given rectangle.



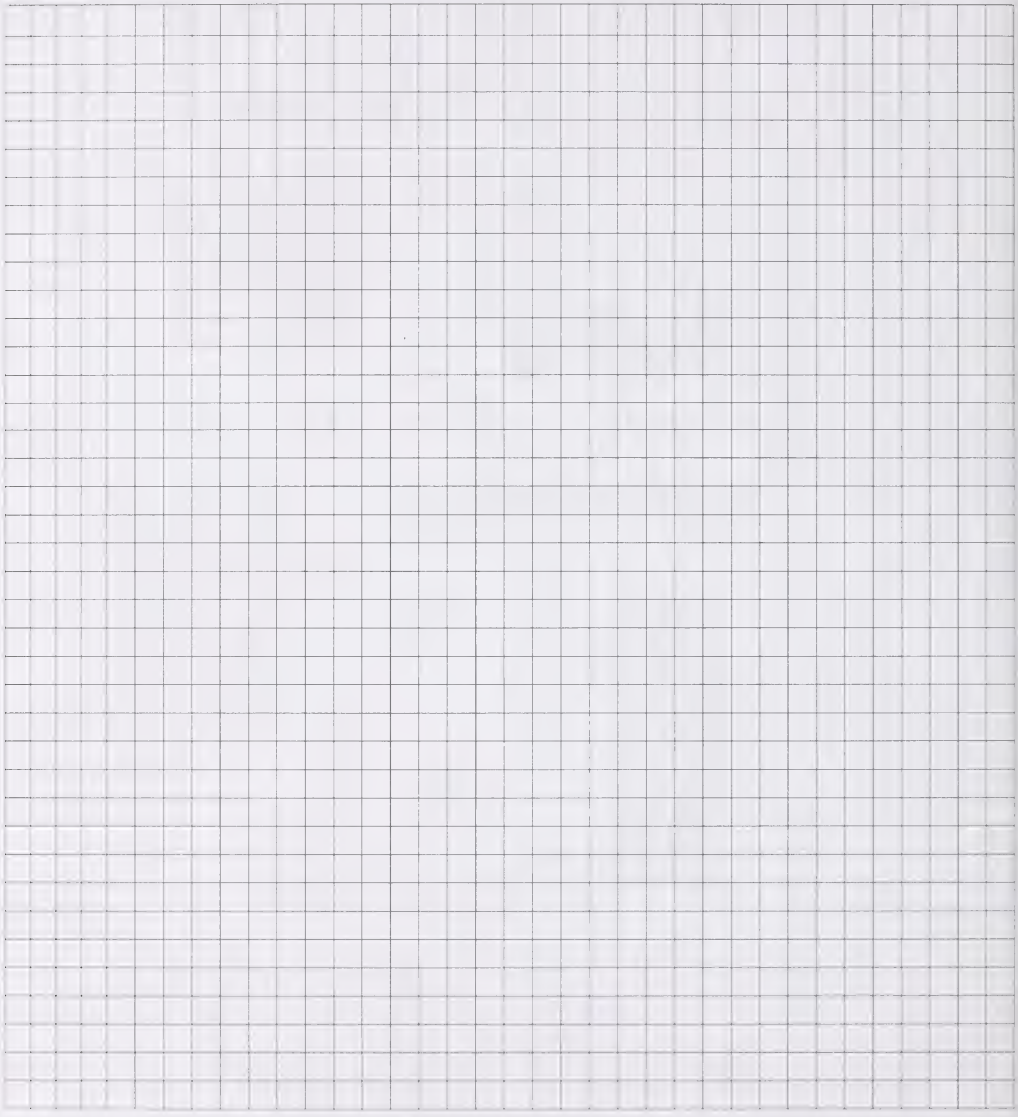
1. Rectangle 1_____

2. Rectangle 2_____

3. Rectangle 3_____

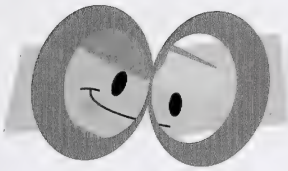
4. Rectangle 4_____

5. Rectangle 5_____



Lesson 9

Combining Transformations



Let's Explore

Exploration 1: Compositions

Materials: Internet, Pencil

Use the following activity to create a composition of:

a. two reflections

b. two translations

c. two rotations

http://standards.nctm.org/document/eexamples/chap6/6.4/part4.htm#applet

Answer the following questions after experiencing the activity:

1. Does the composition of two reflections in two parallel lines change the orientation of the pre-image? Explain.

2. Look at the composition of two reflections in intersecting lines. Which other type of transformation does it resemble?

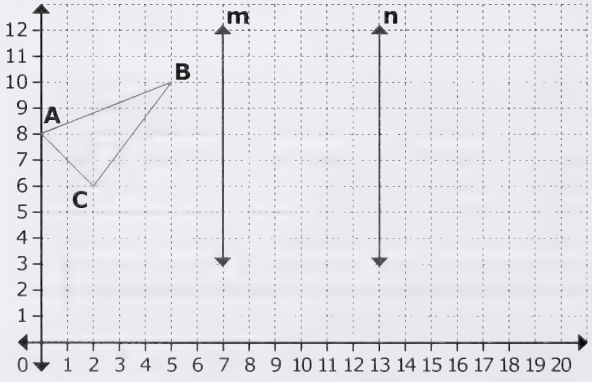
3. Is it possible for the composition of two translations to change the orientation of the pre-image? Why or why not?

4. What happens if two 90° rotations are performed with the same point of rotation?

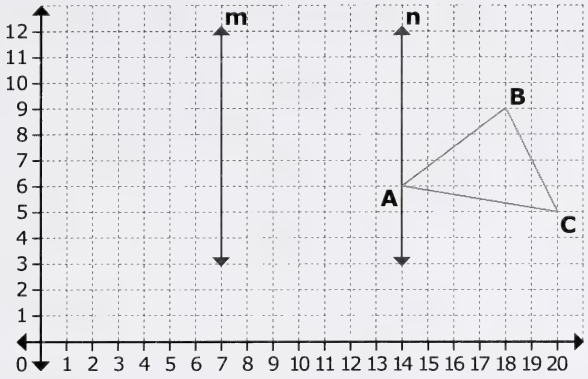
Let's Practice

For 1 – 2: Perform a composition of two reflections in line m and n.

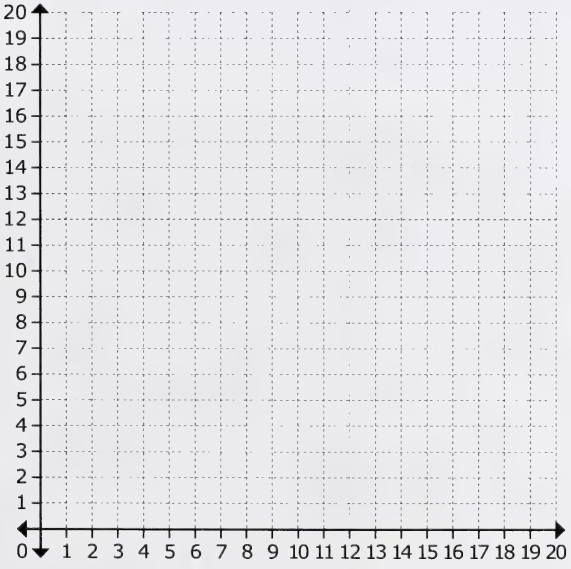
1.



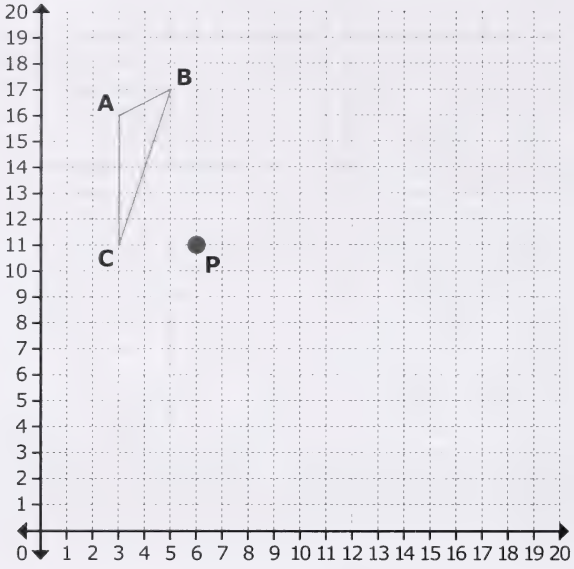
2.

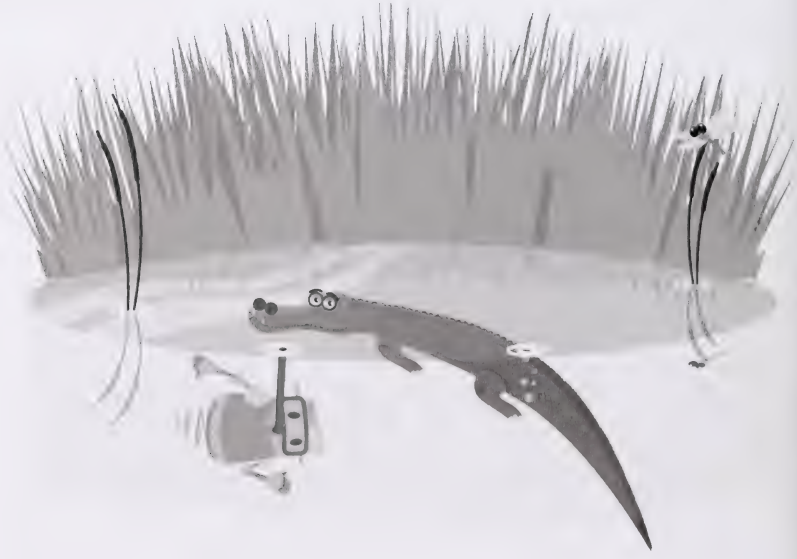


3. Triangle ABC has vertices A (2, 18), B (8, 16), C (3, 16). Graph the pre-image and the image of ABC under a translation of right 1 unit, down 7 units followed by a translation of right 5 units, up 2 units.

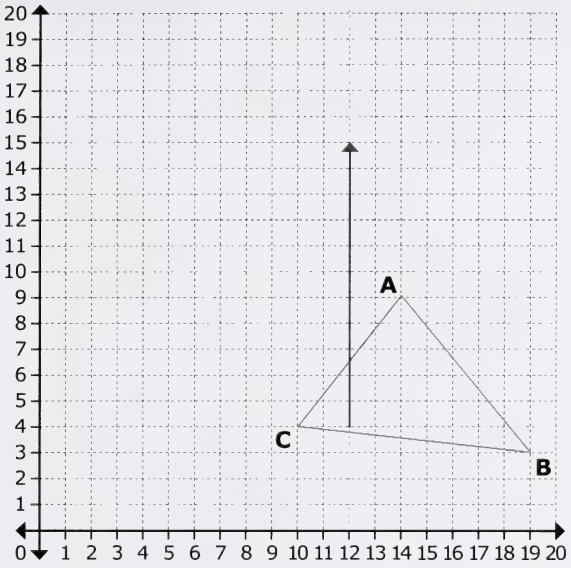


4. Rotate triangle ABC 90° clockwise about point P followed by a 180° clockwise rotation about point P.

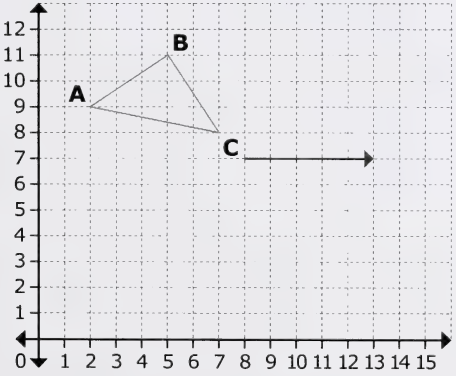




5. Perform a glide reflection using the given slide arrow.



6. Perform a glide reflection using the given slide arrow.



Mixed Review

For 1 – 5: Draw a rectangle with the given perimeter on the grid.

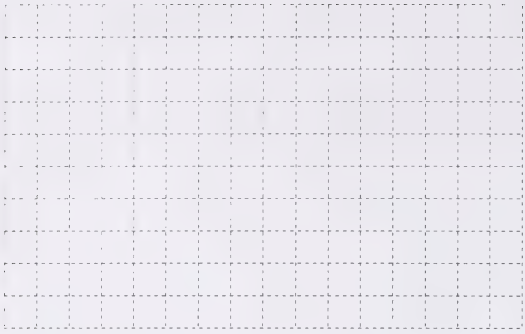
1. 12 units

2. 10 units

3. 18 units

4. 20 units

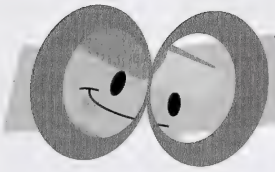
5. 16 units



Math 6 Unit 3

Lesson 10

Transformational Designs

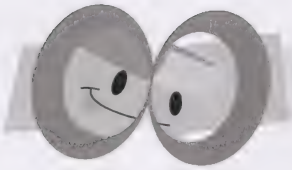


Let's Explore

Exploration 1: Create a Letter Pattern

Materials: Construction Paper, Scissors, Straight Edge, Pencil

1. Create the initials of your name using construction paper.
2. Cut out at least 10 of each letter.
3. Rotate, translate, and reflect your letters to form a pattern.
4. Make a sketch of the pattern you created.



Let's Explore

Exploration 2: Create a Tessellation

Materials: Tracing Paper, Pencil Crayons, Scissors, Pencil, Construction Paper, Page of Shapes from the back of this unit in your wookbook.

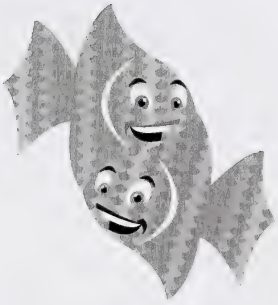
1. Create your own tessellation using one of the shapes from the Exploration page in your Workbook. Use colour to make your shape more interesting.
2. Identify any rotations, translations or reflections in your tessellation. Be sure to hand in your tessellation with your Workbook.

Let's Practice

For 1 – 4: Observe the following tessellations. What type of transformation has been performed?

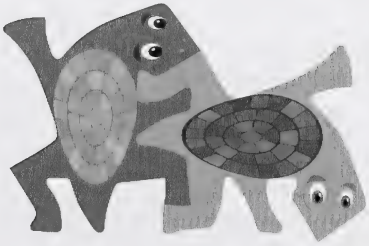
1. _____

2. _____



3. _____

4. _____



For 5 – 6: Use the following tessellation to answer the questions.

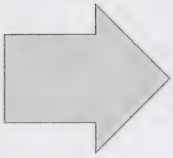
5. What type of transformation takes Face 1 to Face 2?

6. What type of transformation takes Face 3 to Face 4?

7. Which of the following shapes will tessellate?

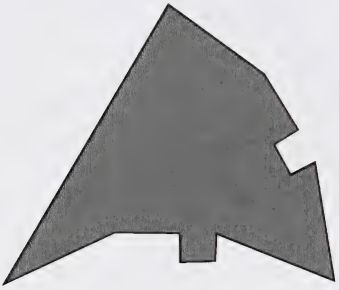
a.

b.

c. 

d.

8. Lian created a shape that she wants to use to make a tessellation. Describe how she created the shape.

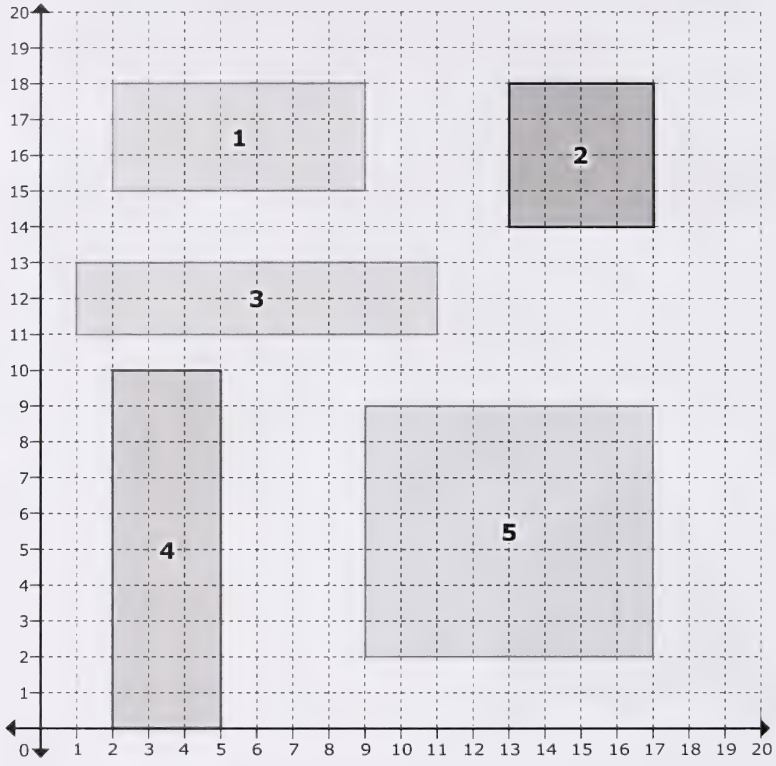


9. Use the Internet or an Encyclopaedia to find a work of art that includes a tessellation. Describe the work of art and the figures in the tessellation.

10. Reflect: Describe any common tessellations that you see in your home.

Mixed Review

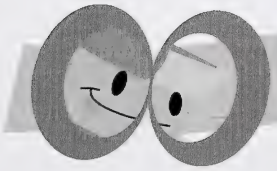
For 1 – 5: Find the perimeter and the area of each given figure.



1. Perimeter _____ Area _____
2. Perimeter _____ Area _____
3. Perimeter _____ Area _____
4. Perimeter _____ Area _____
5. Perimeter _____ Area _____

Lesson 11

Perimeter of Polygons



Let's Explore

Exploration 1: Perimeter of Regular Polygons

Materials: Pencil

Find the perimeter of the regular polygons with a side length of 3 cm.

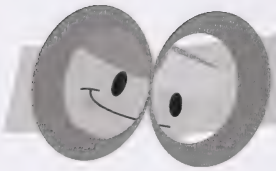
Regular Polygon	Number of Sides	Side Length (cm)	Perimeter (cm)
Equilateral Triangle	3	3	9
Square	4	3	12
Pentagon	5	3	
Hexagon			
Heptagon			
Octagon			
Nonagon			
Decagon			

1. What pattern do you notice in the perimeters of the regular polygons?

2. How would the pattern change if the side length is 4 cm?

3. A regular polygon has 15 sides. The side length is 4 units. What is the perimeter?

4. Write a rule to find the perimeter, **P**, of a regular polygon with **n** sides and a side length of **s**.



Let's Explore

Exploration 2: Perimeter of a Rectangle

Materials: String, Centimetre Ruler, Scissors, Pencil

1. Cut a length of string that is 42 centimetres long.
2. Create at least six rectangles that have whole number side lengths. Record the measures in the given table.

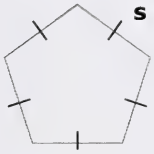
Length	Width	Perimeter

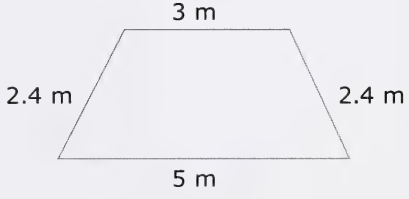
3. Do you notice a relationship between the side lengths and the perimeter?

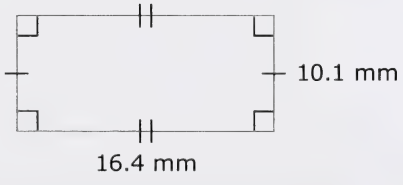
4. Write a rule for the perimeter, **P**, of a rectangle given the length, **l**, and the width, **w**.

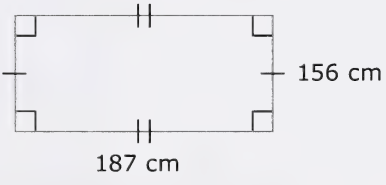
Let's Practice

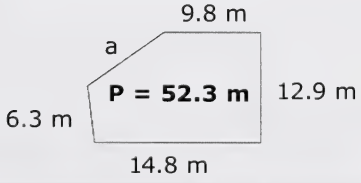
For 1 – 18: Find the perimeter or the missing measure of each polygon.

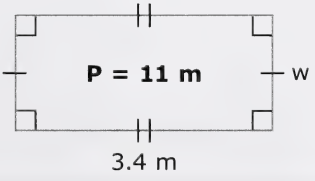
1. 

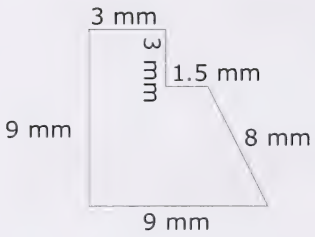
2. 

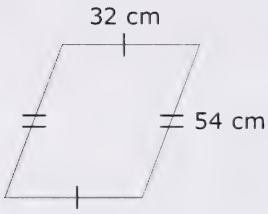
3. 

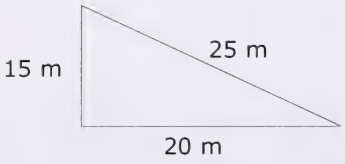
4. 

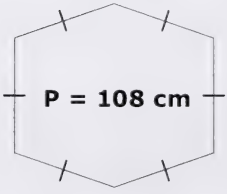
5. 

6. 

7. 

8. 

9. 

10. 

11. regular octagon, side length = 18 m

12. square, side length = 3.75 mm

13. nonagon, perimeter = 58.5 m

14. rectangle, l = 14 cm, w = 12 cm

15. rectangle, l = 10 m, P = 32 m

16. equilateral triangle, side length = 8 mm

17. rectangle, w = 18 cm, P = 76 cm

18. regular pentagon, side length = 3.5 cm

For 19 – 22: Use order of operations to find the perimeters of the given rectangles in three ways.

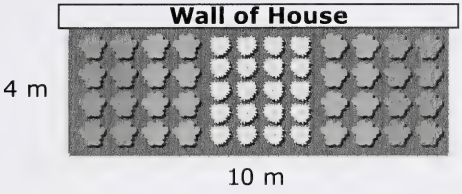
		P = l + l + w + w	P = 2l + 2w	P = 2(l + w)
	Example: l = 3, w = 2	P = 3 + 3 + 2 + 2 P = 10	P = 2(3) + 2(2) P = 6 + 4 P = 10	P = 2(3 + 2) P = 2(5) P = 10
19.	l = 3.5, w = 2.4			
20.	l = 10, w = 8			
21.	l = 7, w = 2.5			
22.	l = 52, w = 38			

23. Reflect: What can you say about the three rules that you used in problems 19 – 22?

For 24 – 27: Solve the problems using the rules for perimeter.

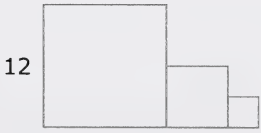
24. Zach and Nina each make a sign to put on the door of their bedroom. Both signs have a perimeter of 60 centimetres. Zach's sign is a rhombus. Nina's sign is a regular pentagon. How are the side lengths of their signs different?

25. Cameron's mom has fenced a garden beside their house. The fence and the wall of the house form a rectangle. What is the total length of the fence?



26. Alyssa and her dad want to build a dog run. They would like the dog run to have a length of 18 metres and a width of 6 metres. What would be the perimeter of the dog run if the length is only half of this measure?

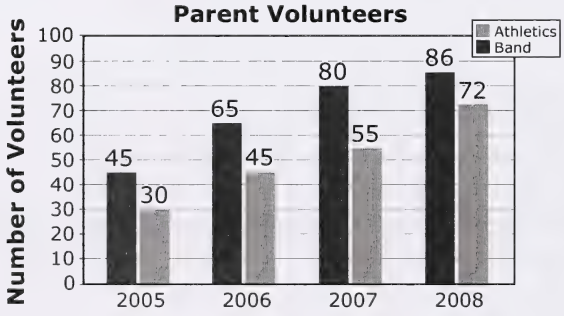
27. Each square in the pattern has a side length that is half the one before it. What is the perimeter of the whole figure?



28. Use a tape measure to find the perimeter of something large in your area. Some possibilities include: a basketball court, tennis court, a playground or a house. Draw a picture of the figure you measured and use a rule to find the perimeter.

Mixed Review

For 1 – 5: Use the bar graph below that shows the number of parent volunteers at Crestview Middle School.



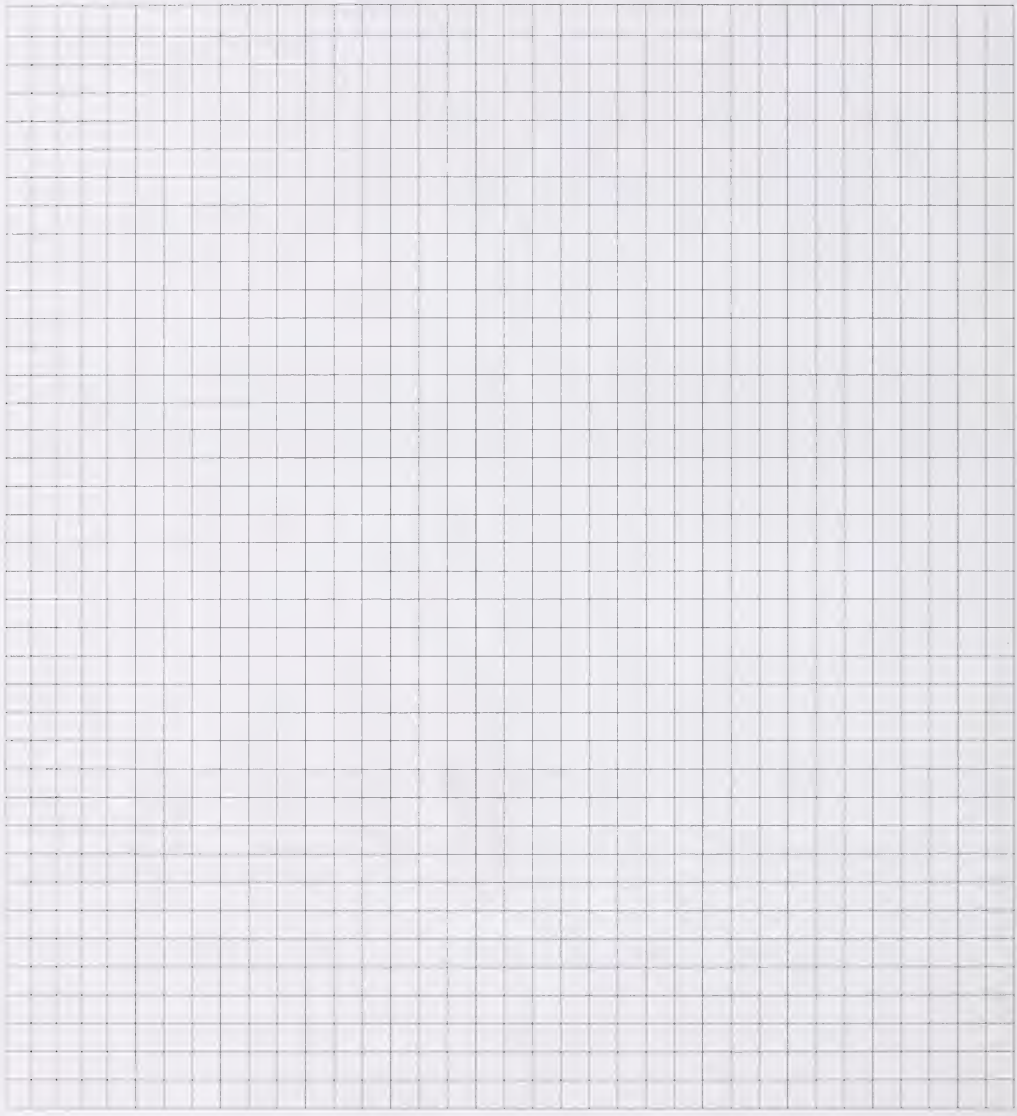
1. How many more volunteers were there for athletics than band in 2008?

2. What was the total number of volunteers for 2006?

3. How many more total volunteers were there in 2008 than in 2005?

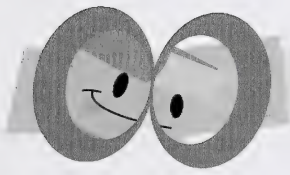
4. If the trend continues, will the number of volunteers increase or decrease in 2009?

5. What fraction of the volunteers in 2007 worked for band?



Lesson 12

Area of Rectangles



Let's Explore

Exploration 1: Generalize Area of a Rectangle

Materials: Square Tiles, or Grid Paper from the back of this unit in your Workbook, Pencil

1. Make rectangles on your Grid Paper, or with Square Tiles, using the side lengths shown in the table. Record the area of each rectangle.

Length	Width	Area (square units)
2	4	
3	4	
4	4	
5	4	
6	4	
3	5	
3	6	
3	7	
3	8	
3	9	
3	10	

2. Do you notice a relationship between the area of the rectangle and the side lengths?

3. Write a rule for the area of a rectangle using the length, l, and the width, w.

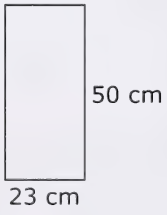
4. Test your rule using a rectangle with a length of 8 units and a width of 4 units.

Let's Practice

For 1 – 8: Find the area of each rectangle.

1.

2.



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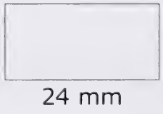
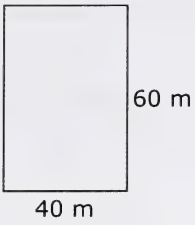
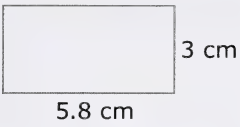
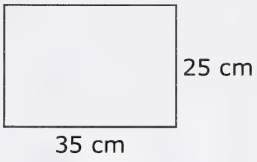


4. 

5. 

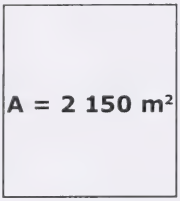
6. 

7. length = 25 mm, width = 10 mm

8. length = 8.5 mm, width = 8 mm

For 9 – 12: Find the measure of the missing side of the rectangles.

9.



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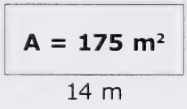


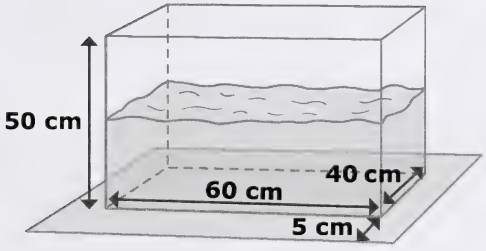
11. A = 750 square units, length = 75 units

12. A = 840 cm^2, width = 20 cm

For 13 – 15: Solve the problems using area and perimeter formulas.

13. Lian has a rectangular puzzle that is 16 square units in area. Zach has a rectangular puzzle that has a perimeter of 16 units. Are the puzzles the same size? Explain your answer.

14. Cameron wants to place his aquarium on a mat to keep the table dry. He wants the mat to extend 5 cm on each side of the base of the aquarium. What is the perimeter of the mat? What is the area of the mat?

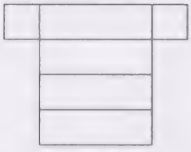


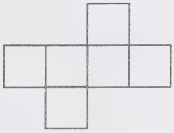
15. Nina's family has a garden that is 12 metres by 18 metres. They need to buy topsoil that is sold for $0.55 per bag and covers 1 square metre. They also want to put a small fence around the garden. The fencing costs $12 per metre. How much will Nina's family need to spend on topsoil and fencing?

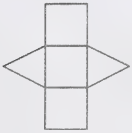
16. Reflect: Can two rectangles have the same area but different perimeters? Explain.

Mixed Review

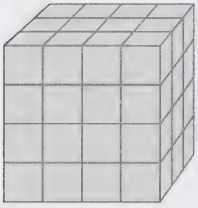
For 1 – 3: Write the name of the three dimensional figure that each net represents.

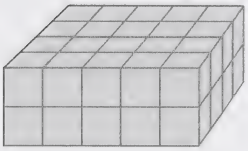
1. 

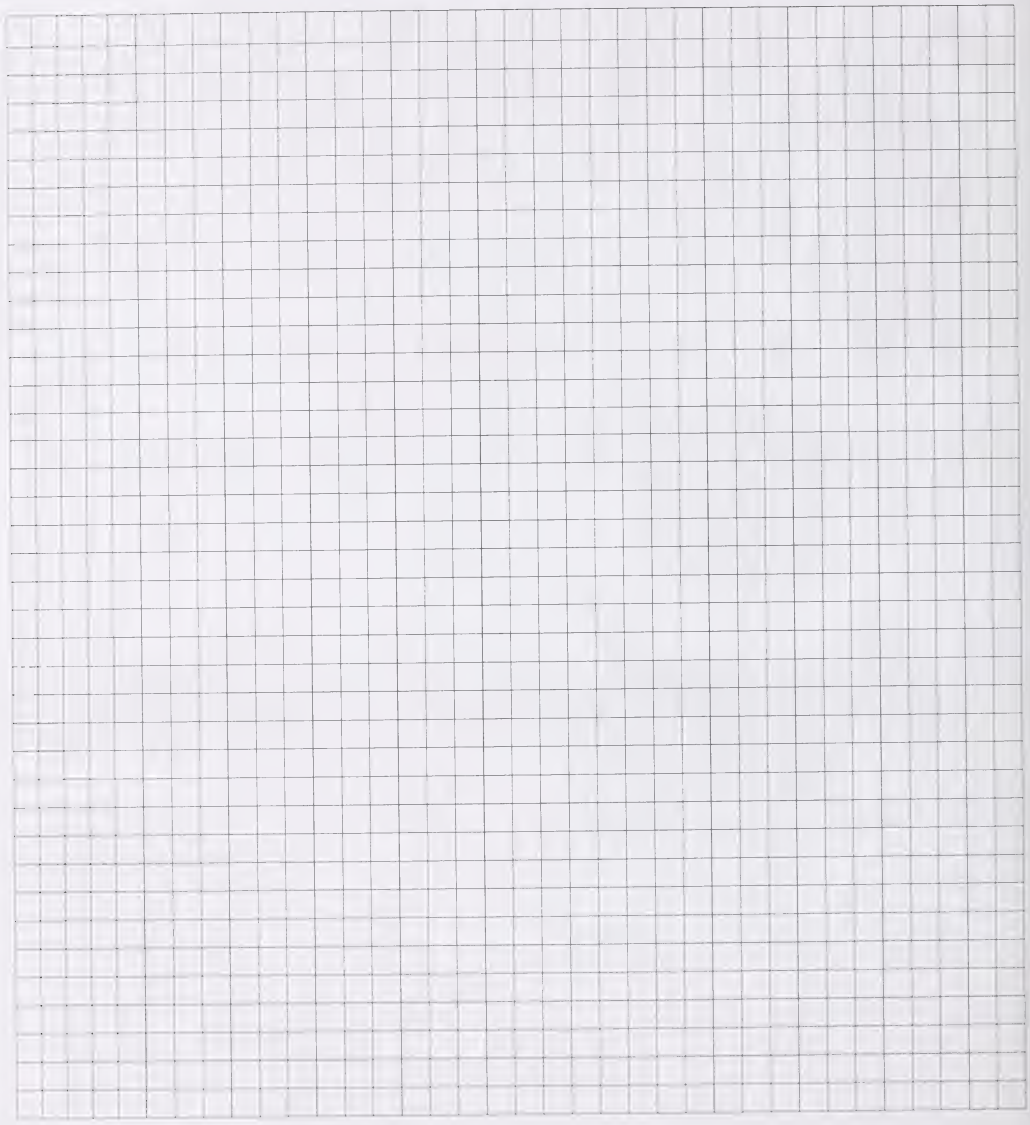
2. 

3. 

For 4 – 5: Find the volume of the given rectangular prism.

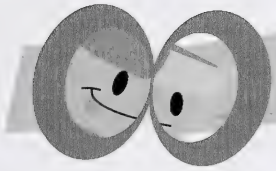
4. 

5. 



Lesson 13

Volume



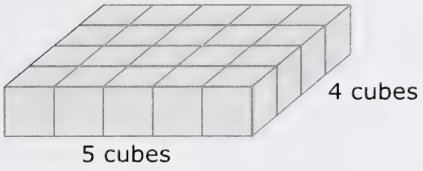
Let's Explore

Exploration 1: A Rule for Volume

Materials: Centimetre Cubes, or Grid Paper from the back of this unit in your Workbook, Pencil

1. Build a rectangular prism that looks like this:

20 Total Cubes



2. Record the volume in the chart. Make all rectangular prisms that you need to make to complete the volume of each in the chart.

Length	Width	Height	Volume
5	4	1	20
5	4	2	
5	4	3	
5	4	4	
5	4	5	
5	4	6	
5	4	7	
5	4	8	

3. Do you notice a pattern to the volume?

4. How does the pattern relate to the length and the width?

5. How does the volume relate to the dimensions?

6. Make several rectangular prisms of your own. Record the dimensions and the volume of each rectangular prism in the chart.

Length	Width	Height	Volume

7. How does the volume relate to the dimensions?

8. Write a rule to find the volume of a rectangular prism given the dimensions. Use V for volume, l for length, w for width, and h for height.

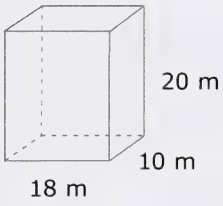
9. Test your rule by finding the volume of a rectangular prism with the following dimensions: $l = 2$, $w = 4$, $h = 3$

Let's Practice

1. Write the formula to find the volume of a rectangular prism, and then write the formula to find the volume of a cube with sides of length **s**.

For 2 – 6: Find the volume of the given figure using the formula V = l • w • h.

2.



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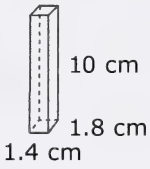

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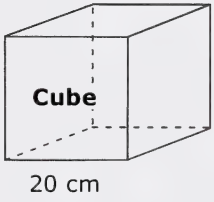

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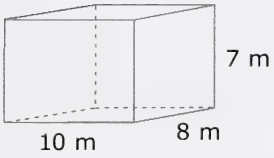
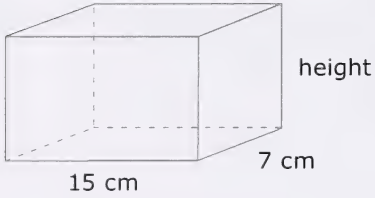


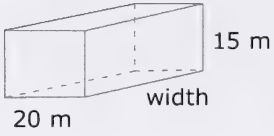
6.

For 7 – 10: Find the missing dimension of the given rectangular prism.

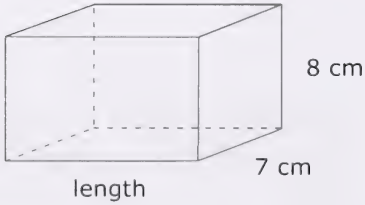
7. **V = 945 cm³**



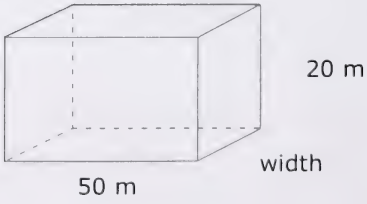
8. **V = 12 000 m³**



9. **V = 672 cm³**



10. **V = 10 000 m³**



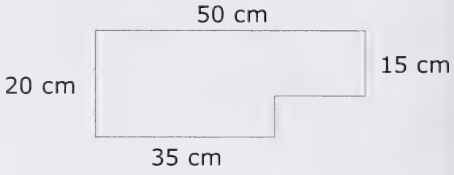
For 11 – 15: Solve the problem using volume, area and perimeter formulas.

11. Alyssa is going to wrap a present in a shoe box. The dimensions of the box are 40 cm x 8 cm x 10.5 cm. The present is in another box that is 30 cm x 6 cm x 8 cm. What is the volume of the empty space inside the shoe box?

12. Nina has 64 centimetre cubes. She builds a cube with all 64 centimetre cubes. How many cubes can she build using her 64 cubes or less? Describe each cube.

13. Cameron has a locker for his hockey gear that has a volume of 1 920 000 cubic centimetres. The front of the locker has a length of 80 cm and height of 400 cm. What is the width of the locker?

14. Lian made a model of her home for a school project. The base of the model is shown. The height of the model is 10 cm. What is the volume of the model in cubic centimetres?

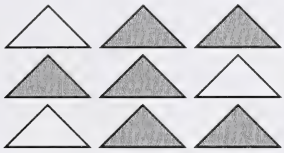


15. Reflect: Lian and Zach both built rectangular prisms using 30 cubes. The height of Lian's prism is 3. The height of Zach's prism is 10. Lian says that her prism has a greater volume than Zach's. Do you agree? Why or why not?

Mixed Review

For 1 – 3: What fraction of the group is shaded?

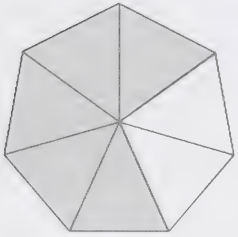
1.

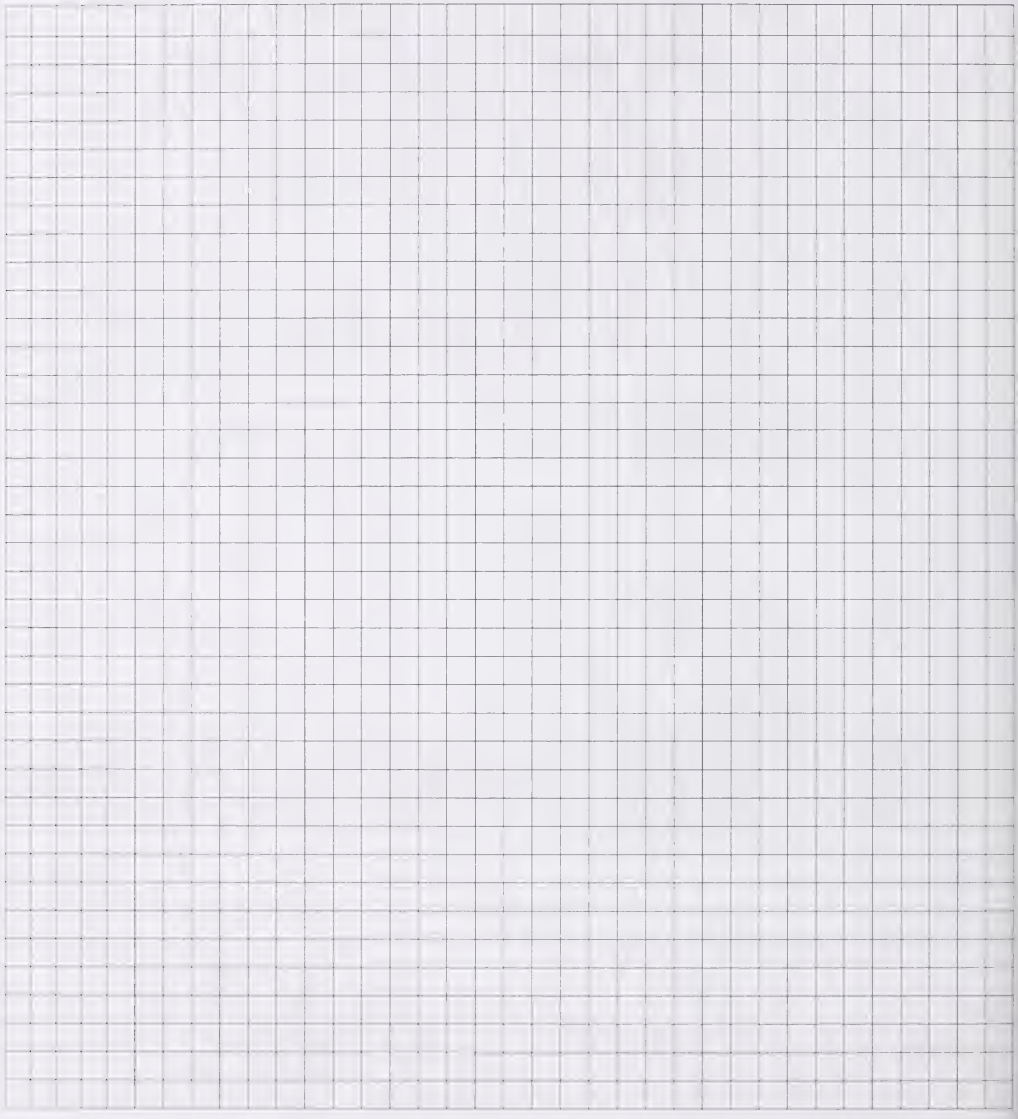
2. 

3.

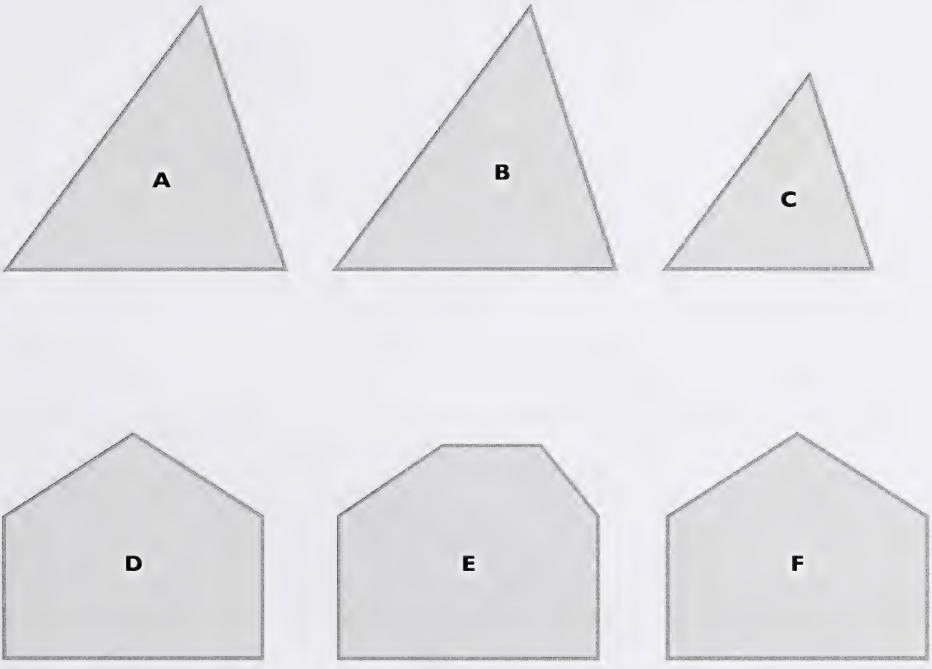
For 4 – 5: What fraction of the figure is shaded?

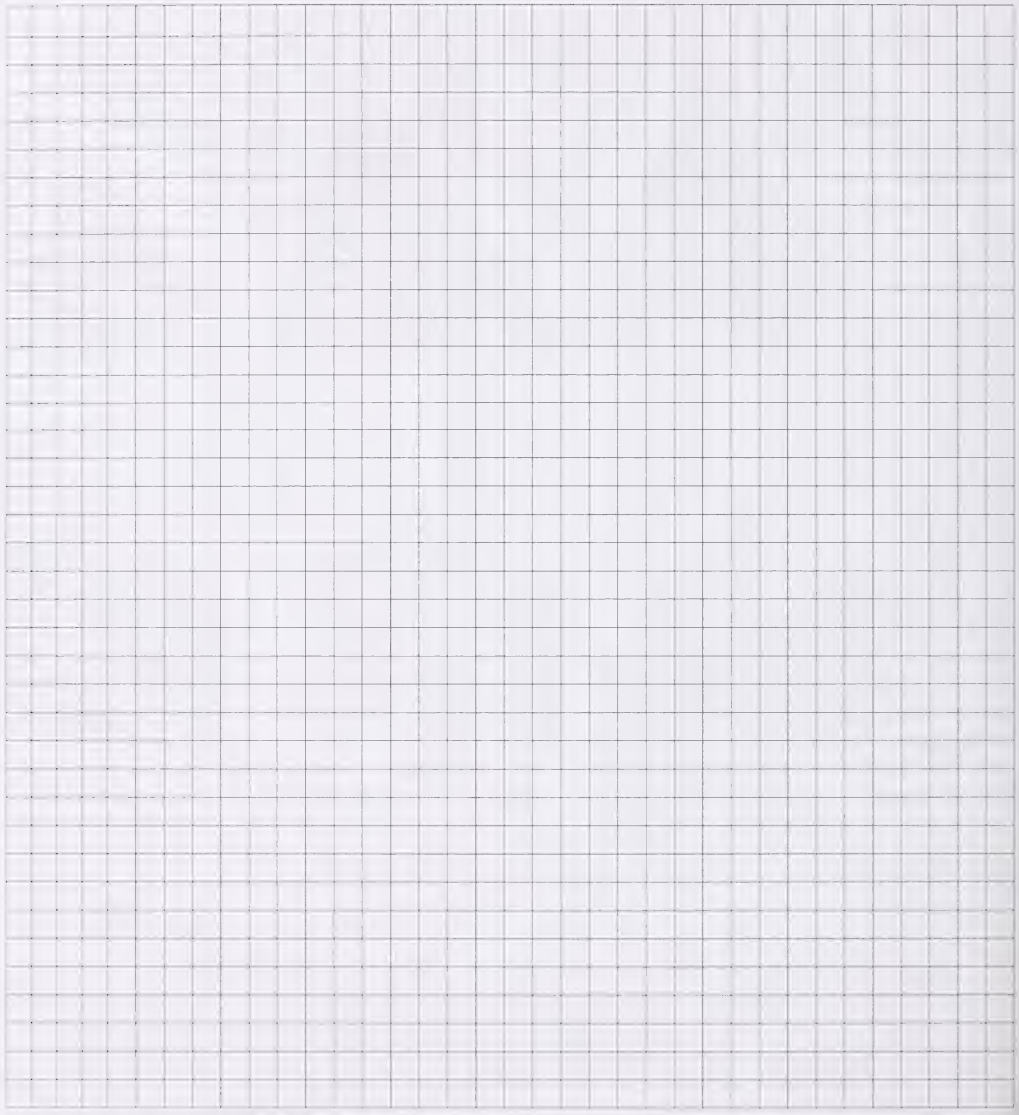
4.

5. 

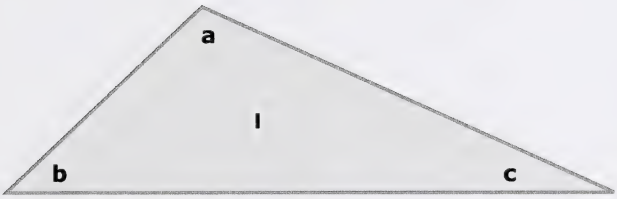


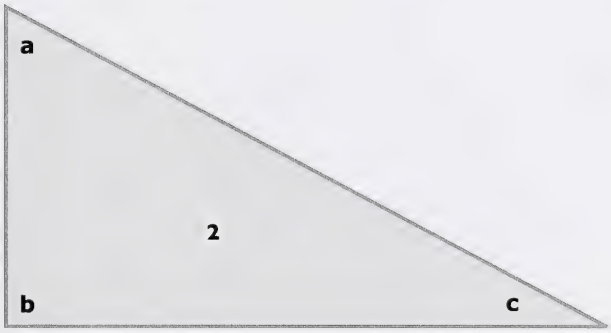
Shapes
Lesson 3, Exploration 2

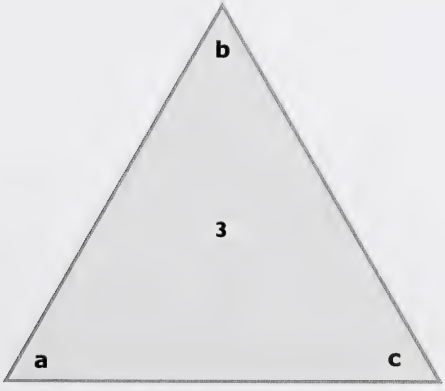


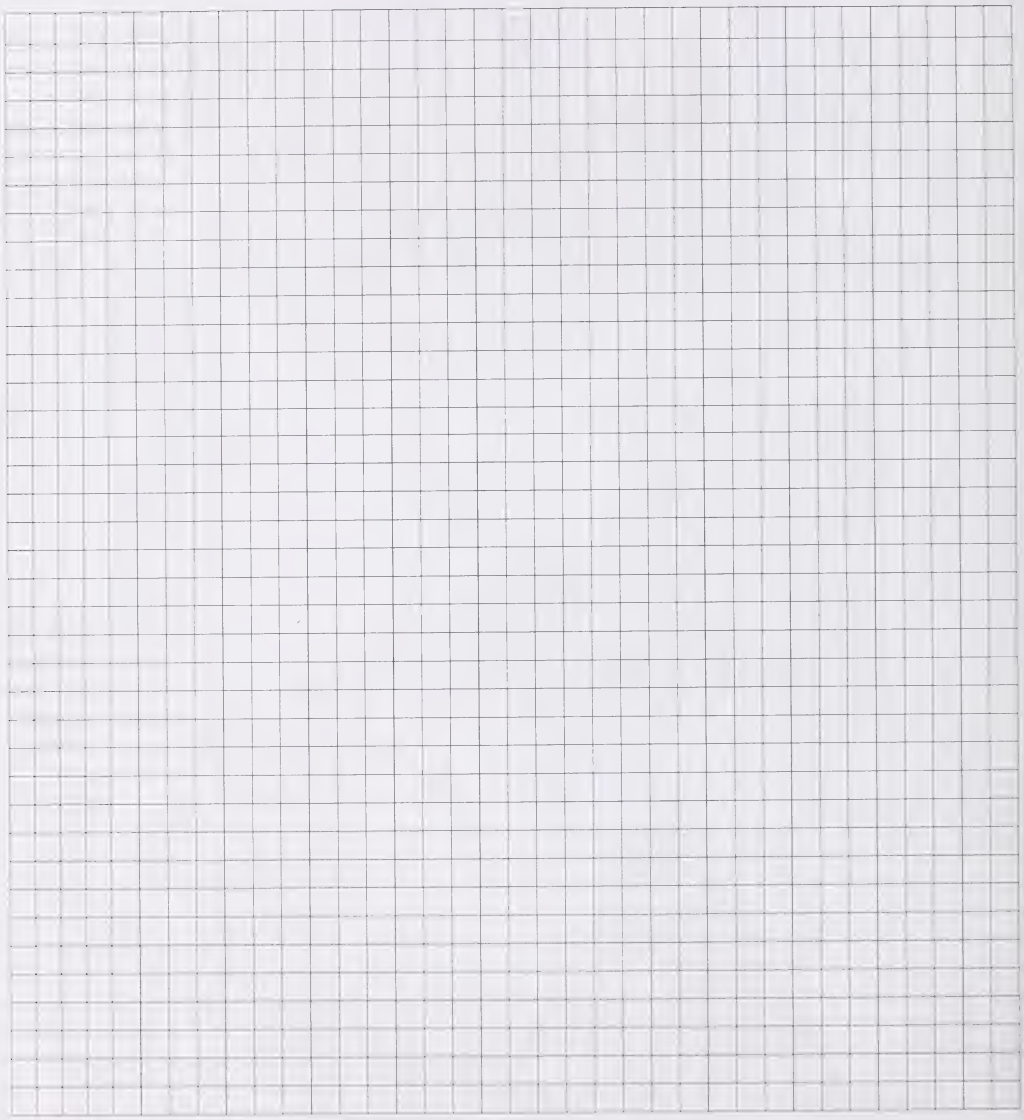


Triangles
Lesson 5, Exploration 1

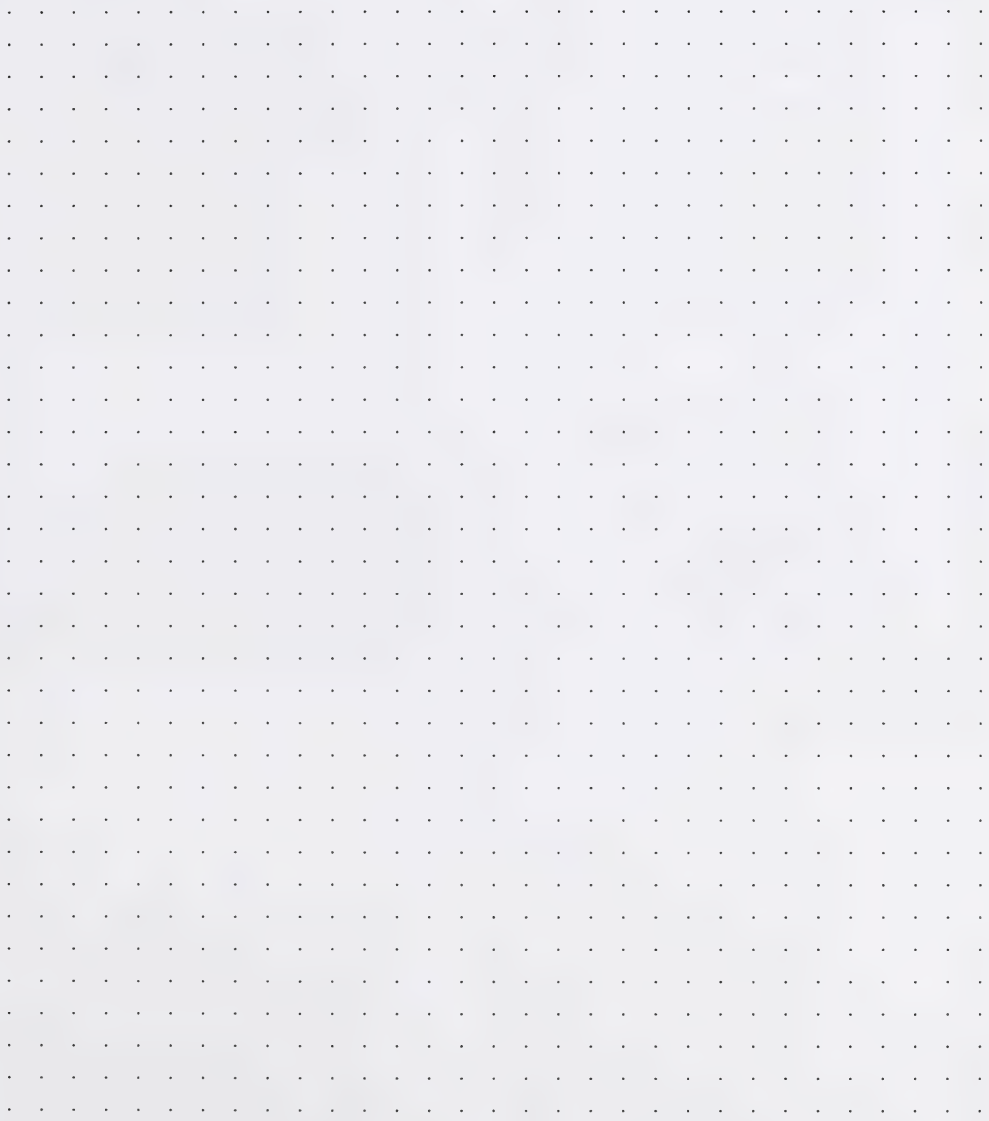




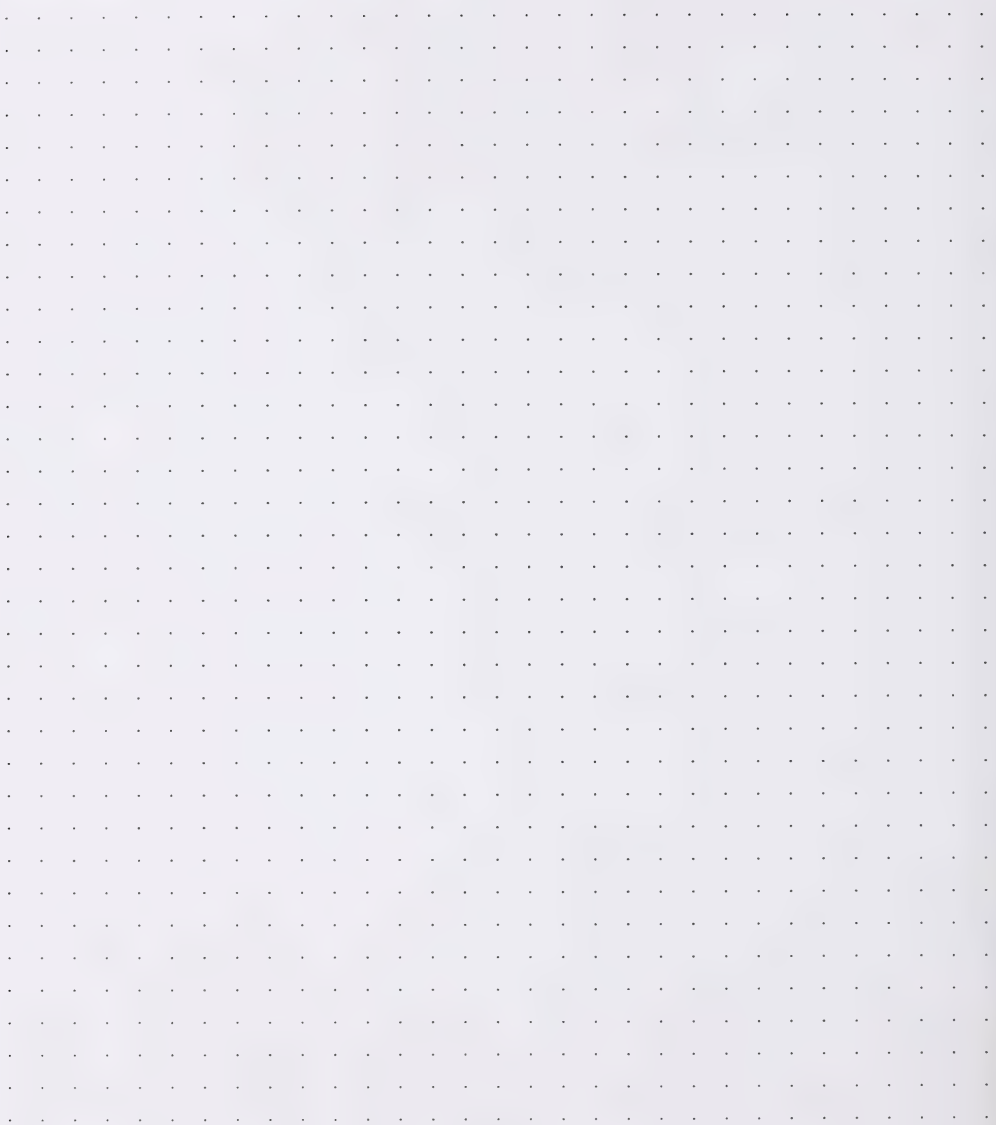




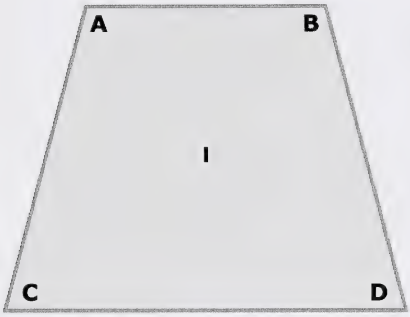
Dot Paper
Lesson 5, Exploration 2

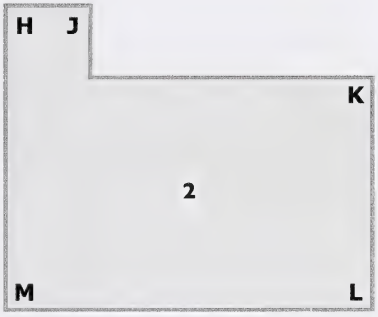


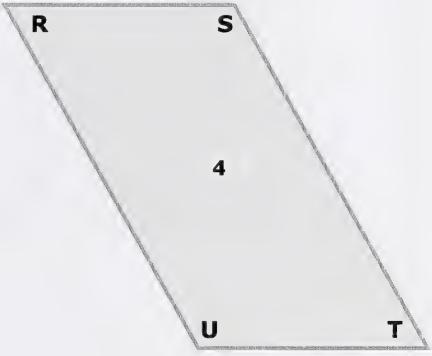
Dot Paper

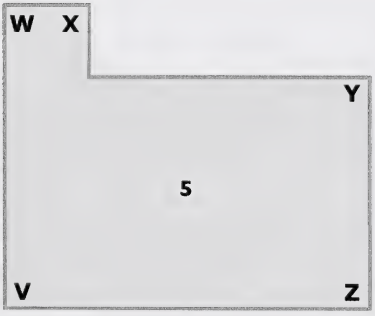


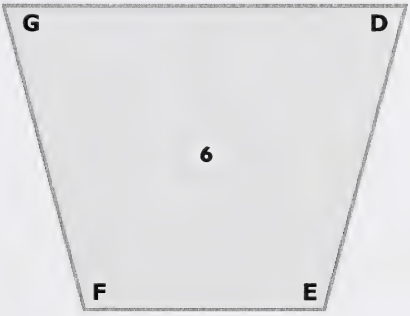
Shapes
Lesson 6, Exploration 1

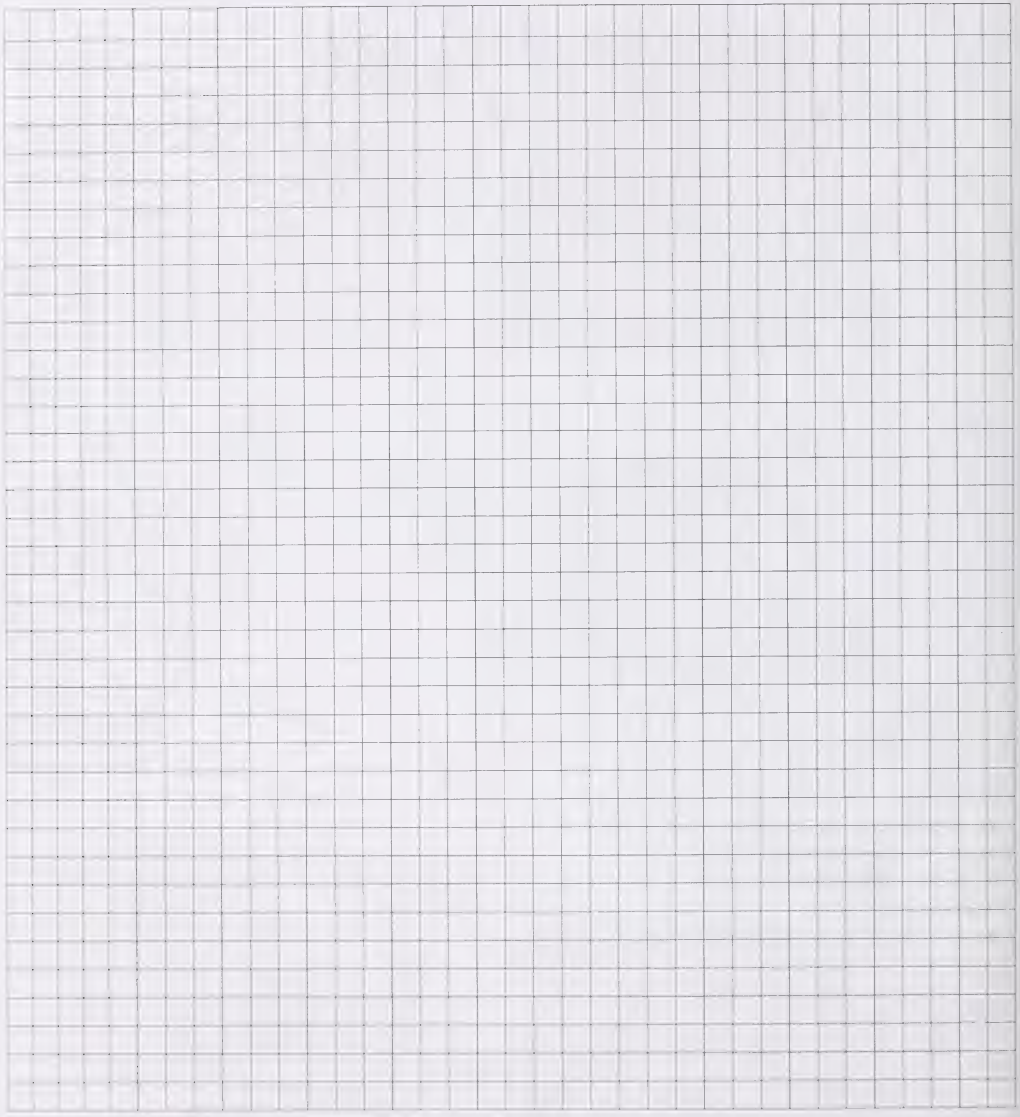




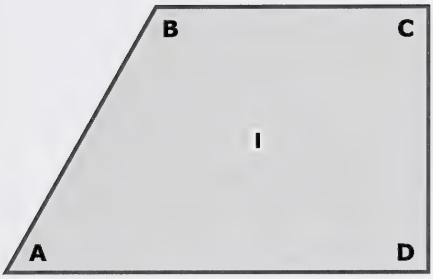


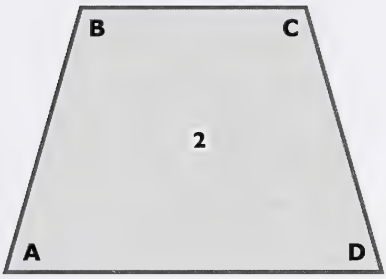


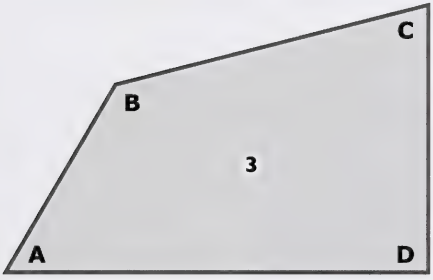


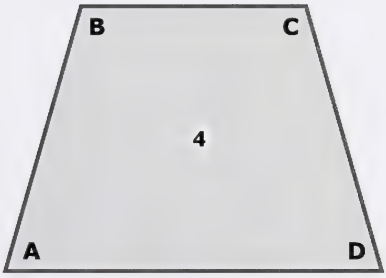


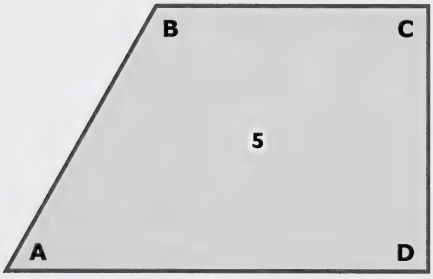
Shapes
Lesson 6, Explorations 2

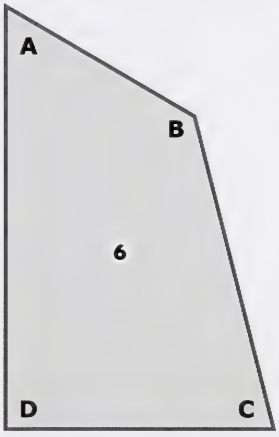


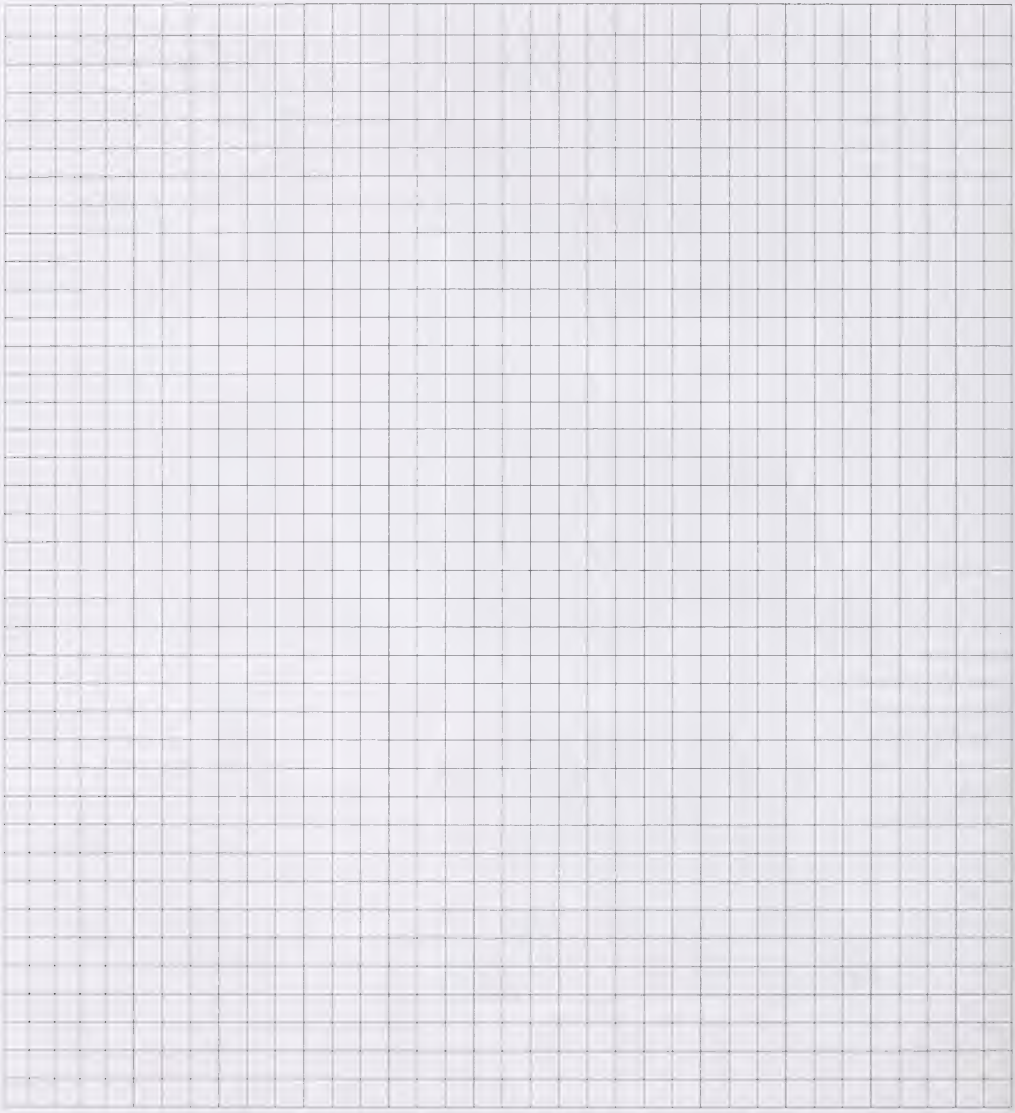






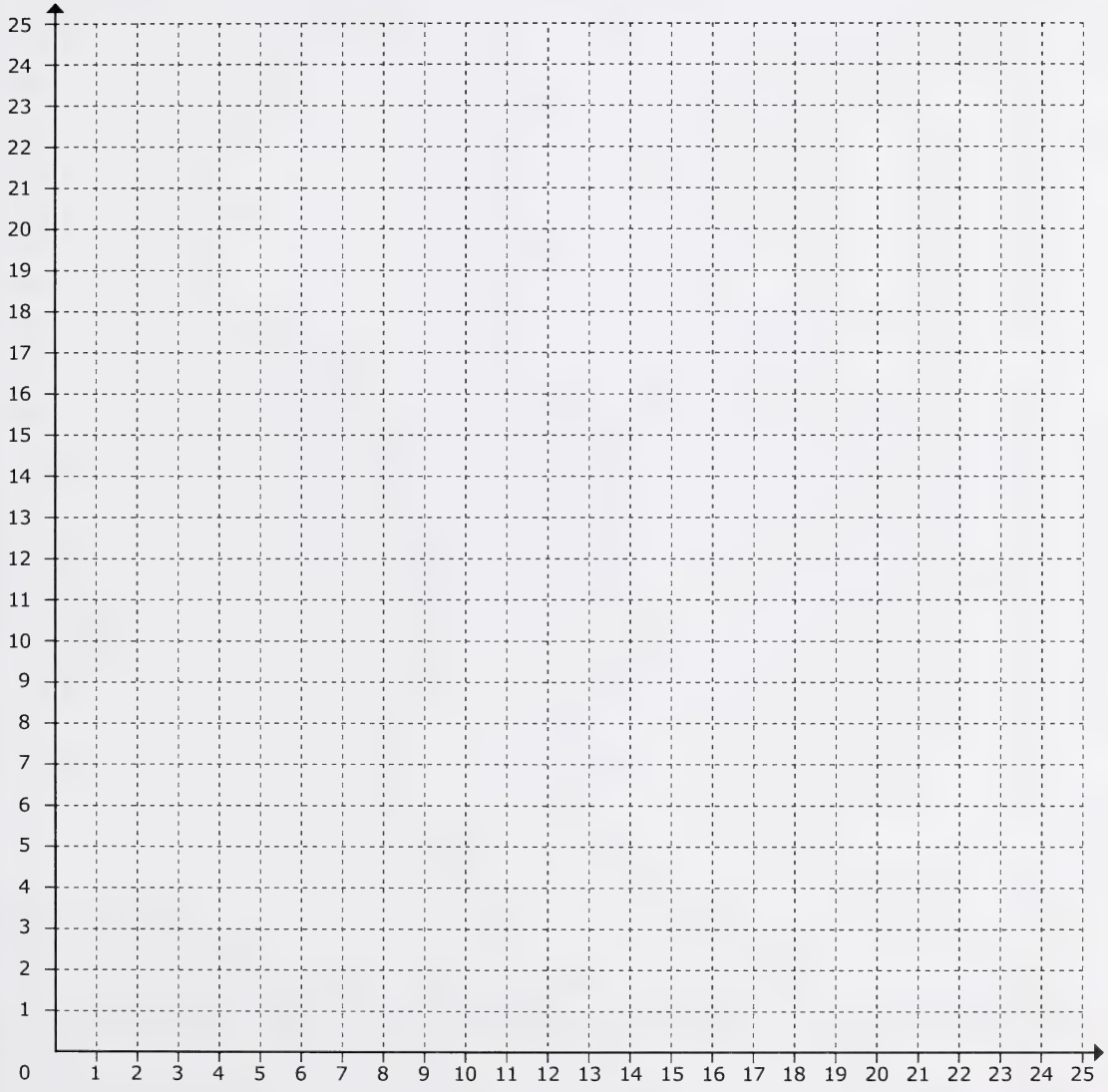




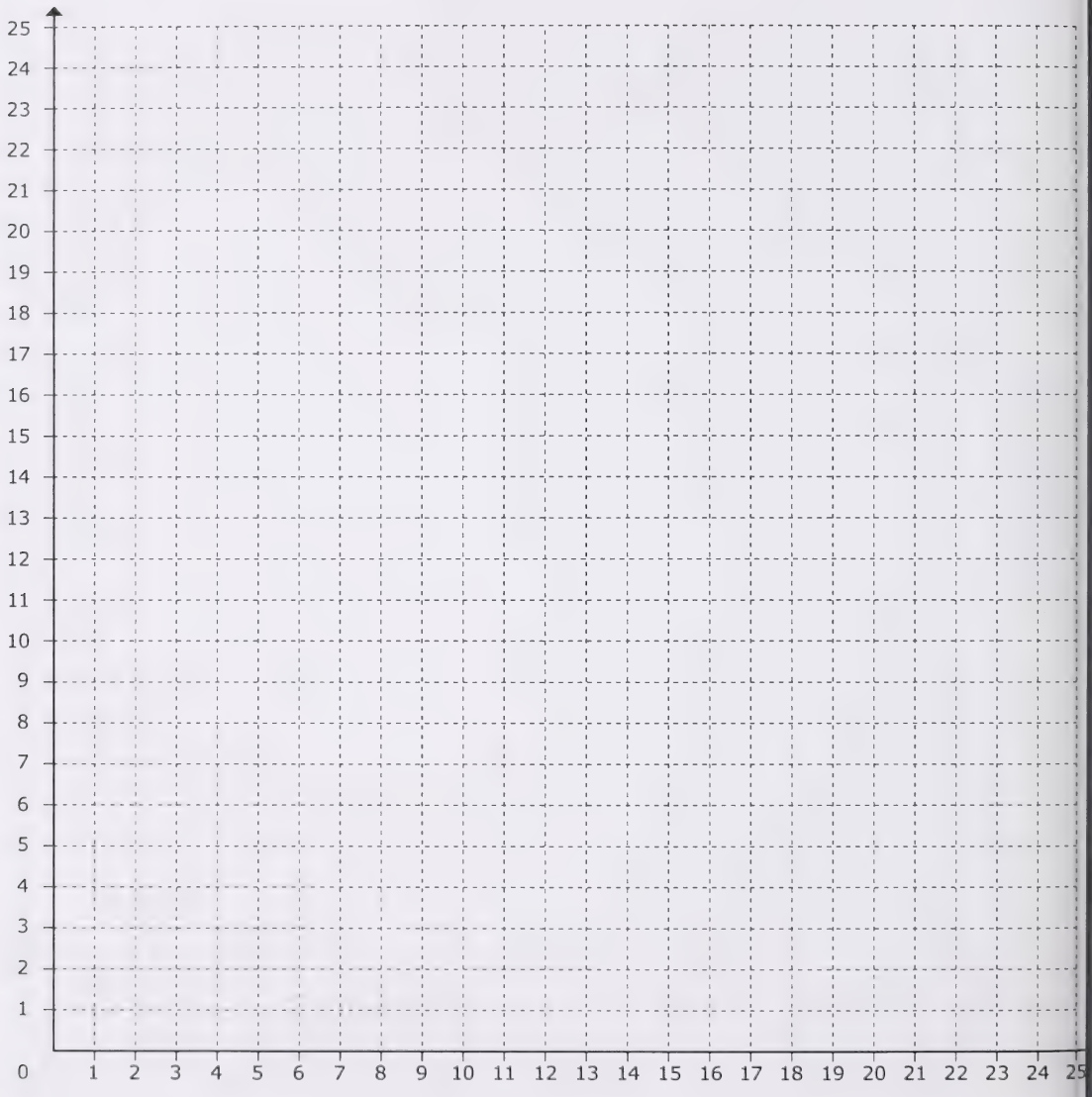


Coordinate Planes

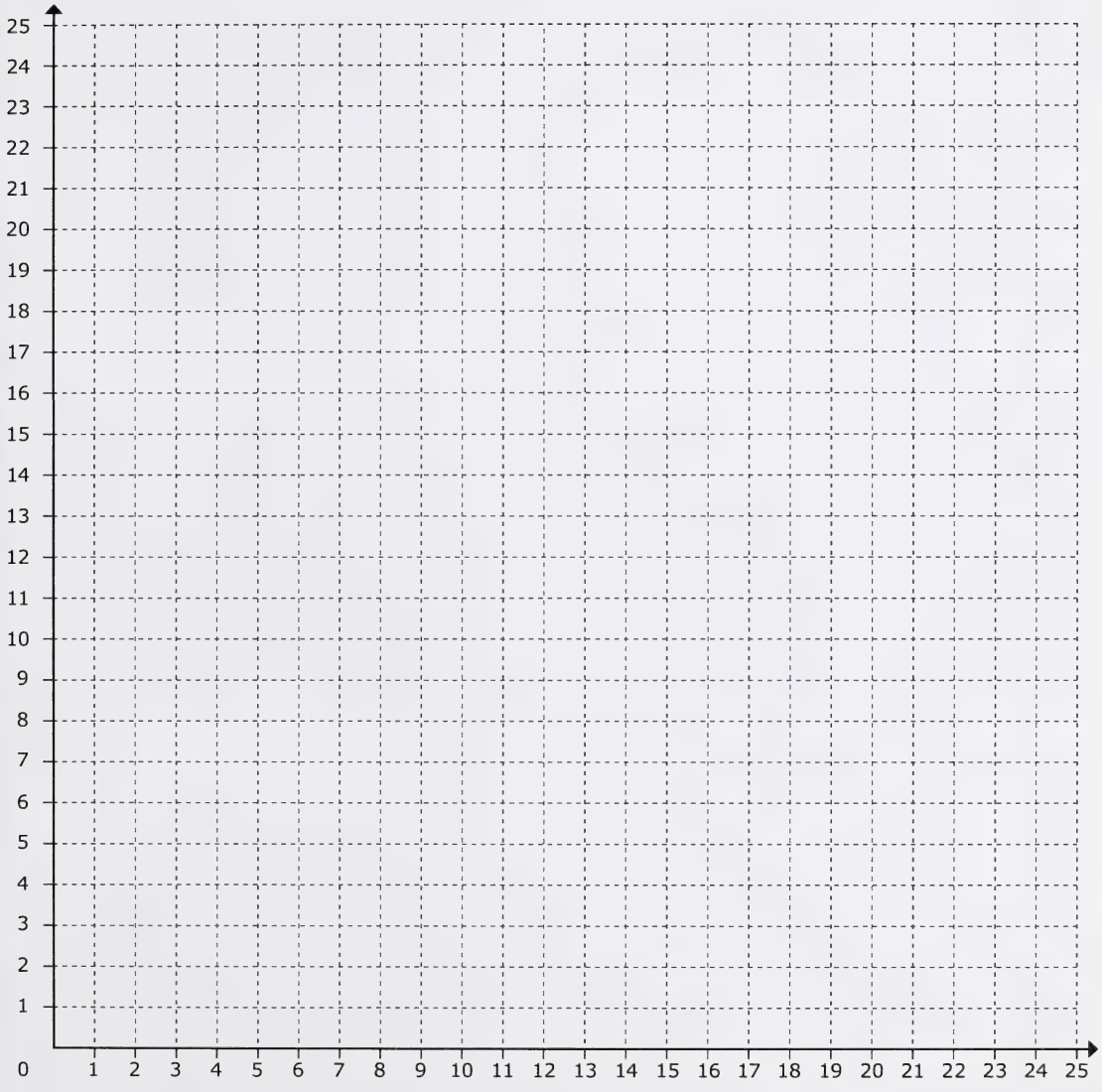
Lesson 8, Exploration 1

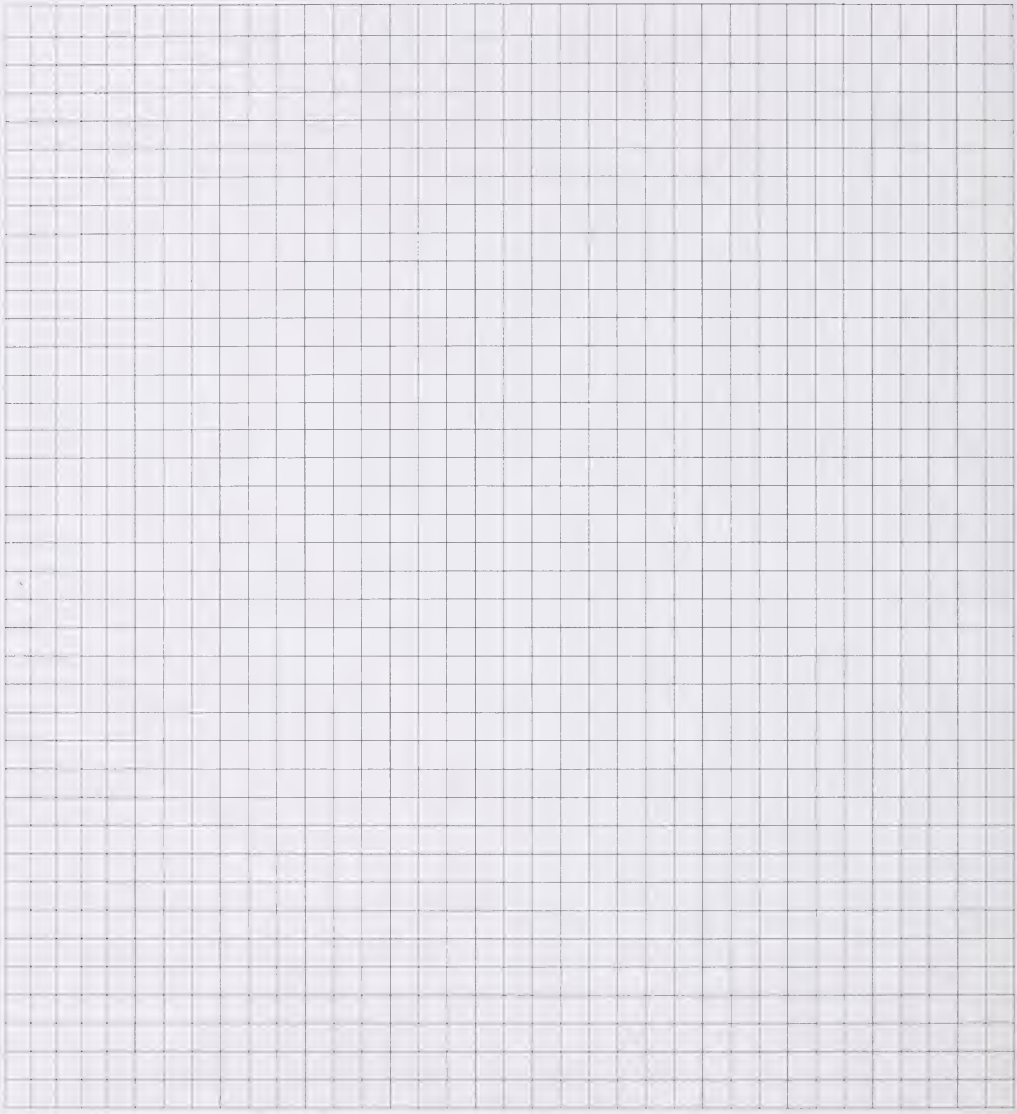


Coordinate Planes

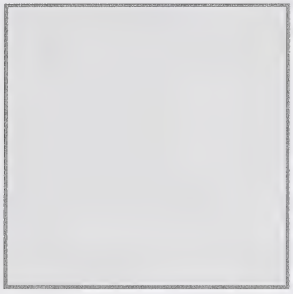


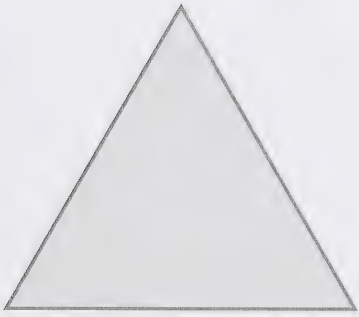
Coordinate Planes

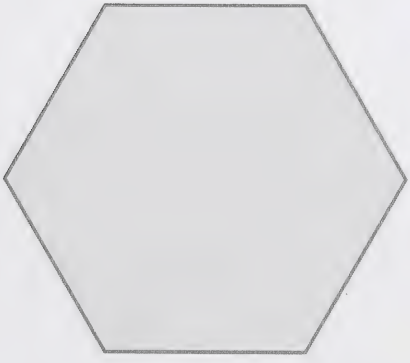


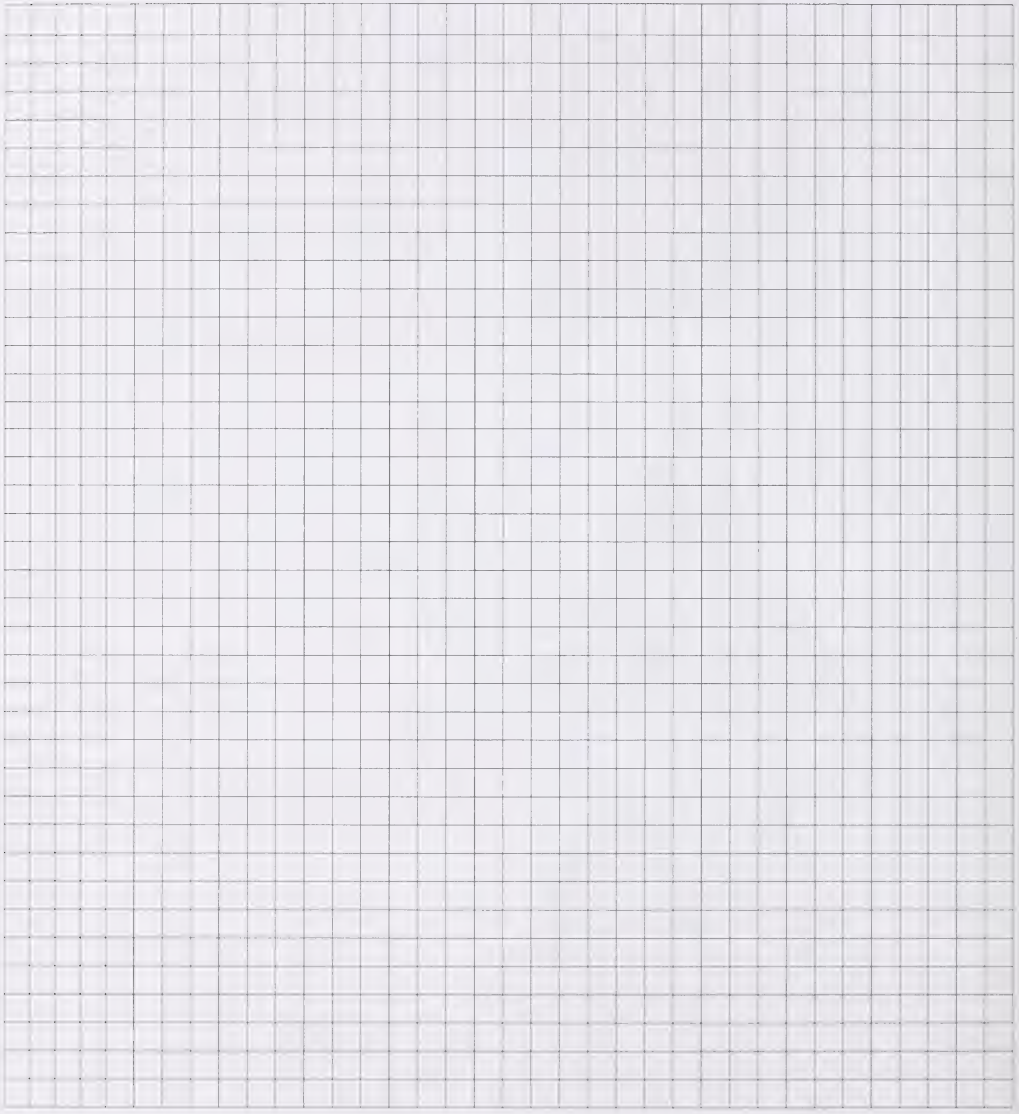


Shapes
Lesson 10, Exploration 2

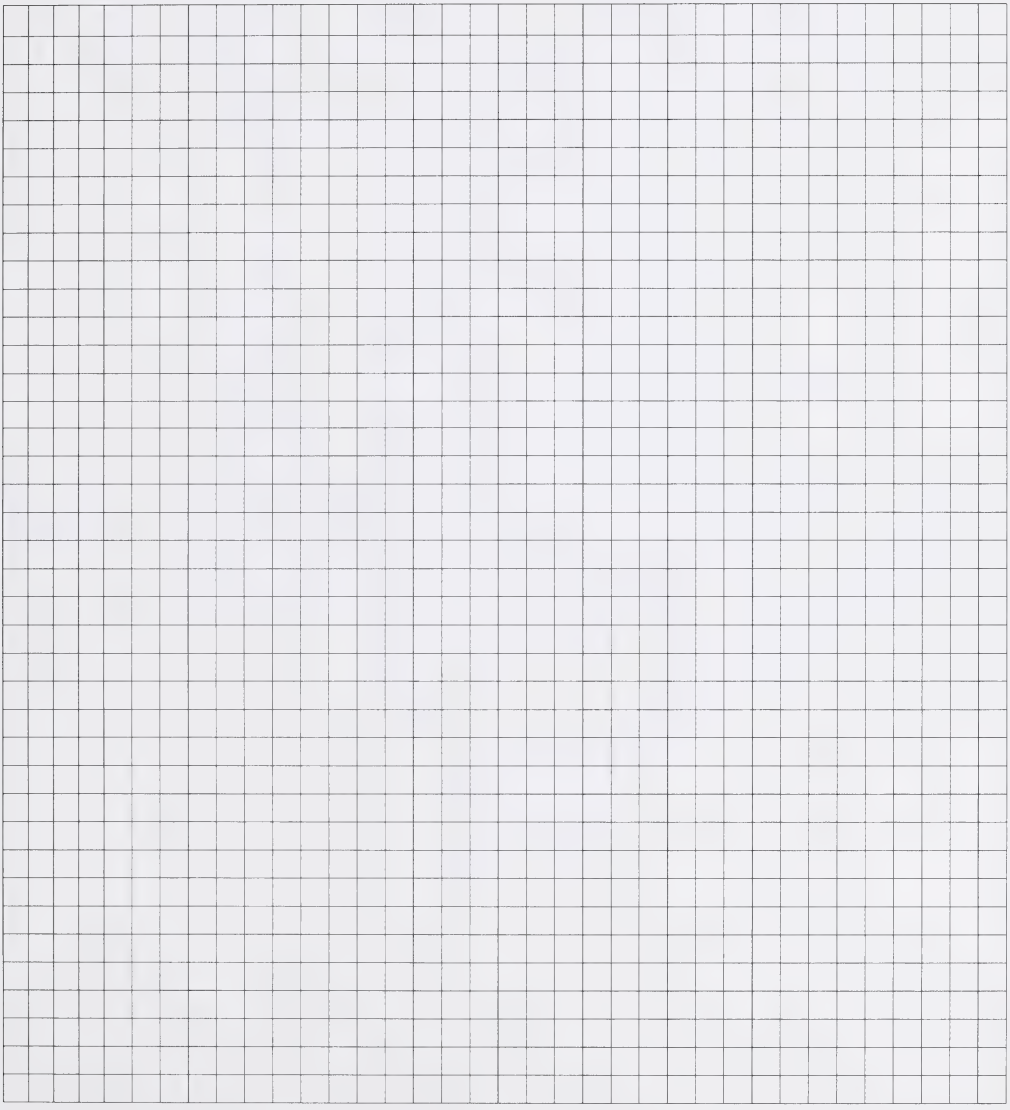


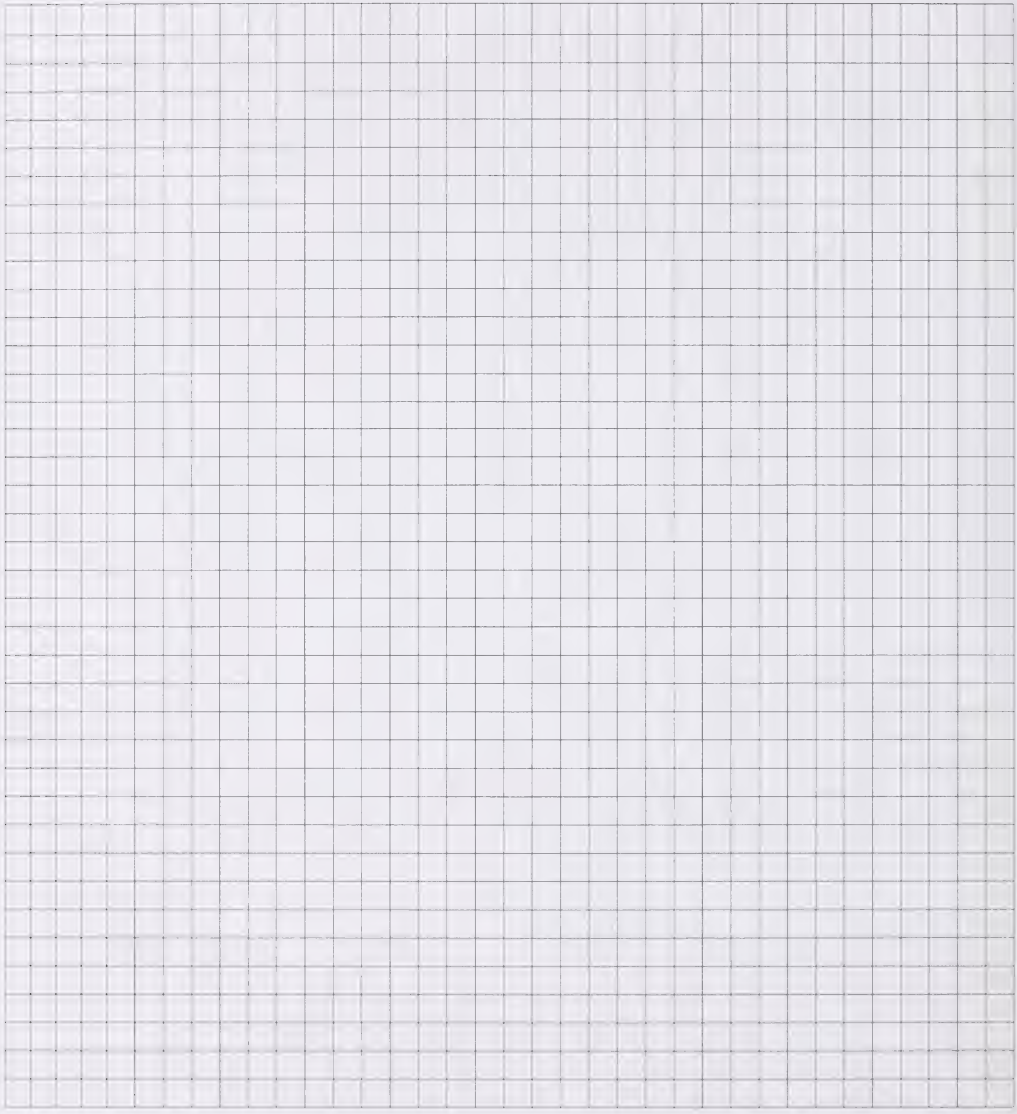


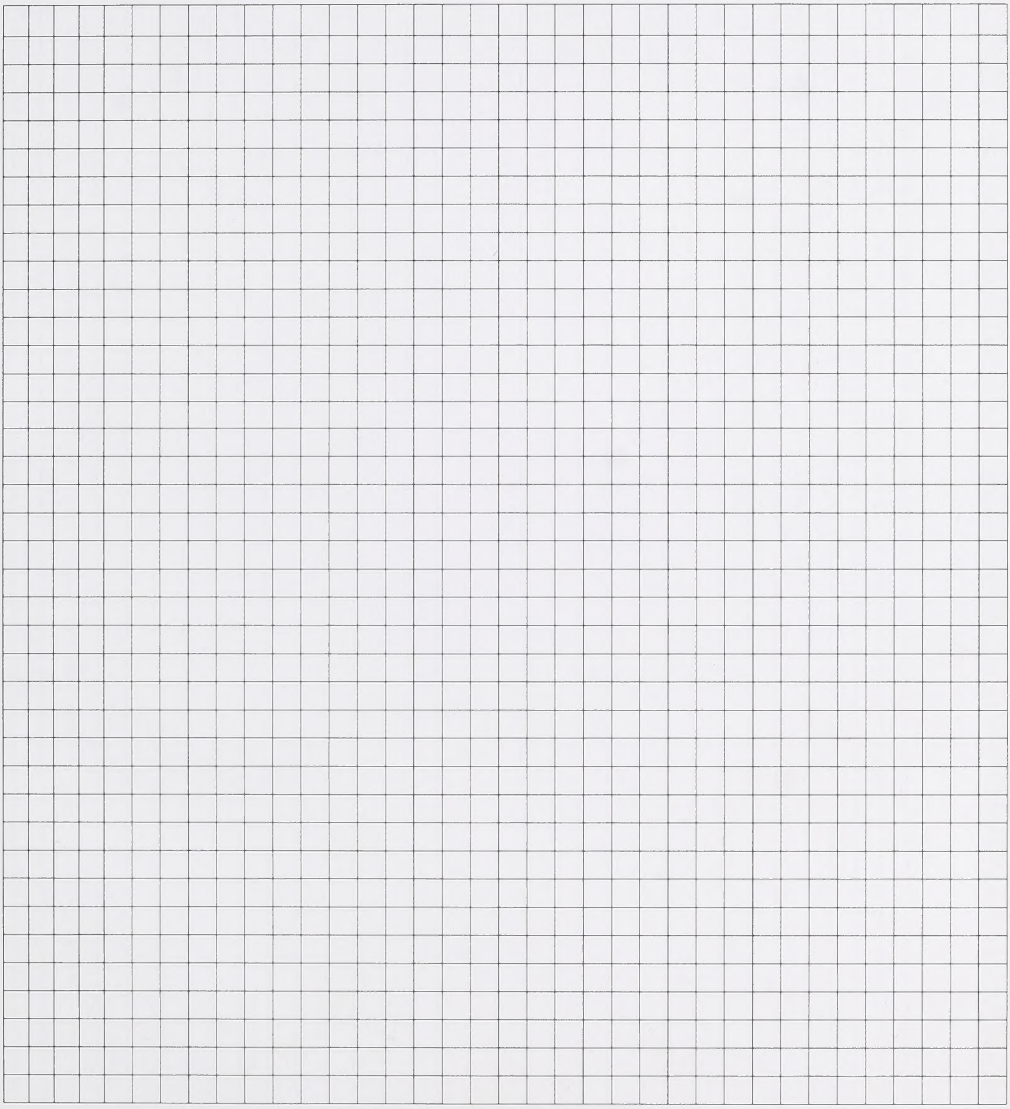


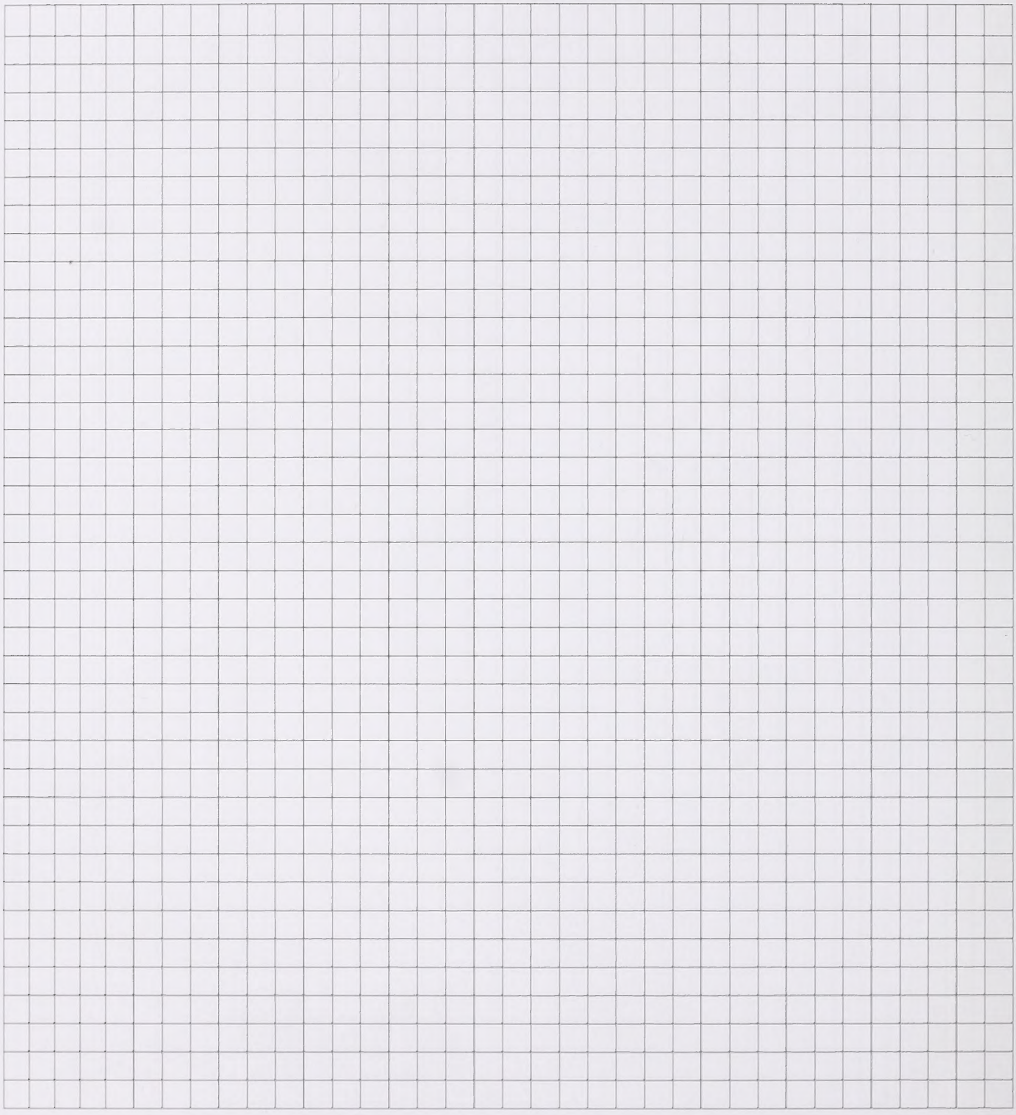


Grid Paper









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